

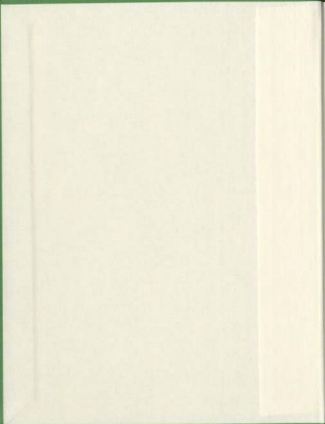
THE PERCEIVED ROLE OF MENTAL SKILLS TRAINING
IN INJURY REHABILITATION AMONG ATHLETES IN
ATLANTIC UNIVERSITY SPORT

CENTRE FOR NEWFOUNDLAND STUDIES

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SARA ALEXANDRA JANE TREW



**The Perceived Role of Mental Skills Training in Injury Rehabilitation
Among Athletes in Atlantic University Sport**

by

Sara Alexandra Jane Trew

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School of Graduate Studies
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Abstract

This study investigated the perceived role of mental skills training in injury rehabilitation among Atlantic University Sport (AUS) athletes. The Trew Mental Skills Training and Injury Rehabilitation Questionnaire was developed by the investigator. The questionnaire, letters of introduction and self-addressed stamped envelopes were distributed to the coaches of AUS teams who were actively competitive at the time of this study. A total of two hundred and ninety questionnaires were completed and returned. The findings indicated that of the 78.3% of athletes who reported sustaining an injury, only 21% of these athletes used mental skills training as part of their injury rehabilitation programs. AUS athletes (62%) also indicated that they would be willing to use mental skills training in future injury rehabilitation programs. This study concluded that although many AUS athletes use mental skills training to enhance performance, they are not being provided with many opportunities to implement mental skills training into injury rehabilitation programs.

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Chapter 1

Introduction

Overview

Injury is an inherent risk of involvement in physical activity and sport. Despite improvements in sports equipment, increased knowledge of injury prevention and the advancements of modern medicine, sports related injuries continue to affect athletes of all levels. The traditional treatment of athletic injuries has primarily been physical, however understanding and incorporating psychological principles may make a difference in the rehabilitation process (Crossman, 1997).

Centuries ago, Plato mentioned never attempting to cure the body without curing the soul, implying that the mind and body function together. It has been said that the motivation of the mind-body connection has stemmed from Cannon's principle of homeostasis, which is defined as a process of interaction between the brain and the body toward maintaining internal stability (Cannon, 1932, as cited by Iwels and Orlick, 1998). It would therefore make sense that by using a more holistic model for injury rehabilitation, caregivers need to focus not only on trying to rehabilitate the physical injury, but also address the athlete as a whole person considering possible psychological and emotional needs.

Injury is often a traumatic experience for athletes. Considering the amount of time and energy that athletes devote to sport, injury may result in athletes having more free time as they may be unable to participate in their regular training regimens. Most

athletes tend to be mentally healthy individuals. Reactions to and coping with injury may cause emotions and feelings that athletes are not accustomed to dealing with (Cressman, 1997). Cornelius (2002) reported depression, fear, hopelessness and anxiety among athletes' psychological reactions to injury. Additional research by Hemmings and Povey (2002) found that stress, anxiety, exercise addiction, depression, anger, problems with treatment compliance and problems with concentration/attention were identified by physiotherapists while working with injured athletes. Thus, it would appear that the implementation of various mental skills may aid athletes in better coping with athletic injury and with the injury rehabilitation process.

Mental skills training and performance enhancement have traditionally focussed on the development of skills to improve performance in competitive environments (Heil, J., Wakefield, C. & Reed, C., 1998). In the past decade, the application of these skills has extended into various avenues including athletic injury and injury rehabilitation. While treating injuries with modern (physical) medicine has traditionally been the primary method of care, athletes who possess certain mental attributes and use various mental skills in conjunction with modern (physical) medicine may recover from an injury at a more rapid rate. Ijzels and Orlick (1991) found that athletes who used goal setting, healing mental imagery and positive self-talk recovered from injury more quickly than athletes who did not practice any type of mental skills training. Loundaghi and Fisher (1993) found similar evidence and in addition indicated that athletes' ability to focus their attention on rehabilitation and stress reduction techniques significantly enhanced injury recovery time. A study by Brewer, Jeffers, Potigas & Van Raalte (1994) found that psychological interventions such as goal setting, imagery and counselling were perceived

positively in the context of sport injury rehabilitation by college students and injured athletes. However, individualizing psychological rehabilitation programs to address the specific needs of the athlete is important to ensure that all needs are met and that athletes will comply.

The previous research findings suggest that the use of psychological interventions in injury rehabilitation may be of benefit to athletes. The intent of this research study was to explore athletes participating in Canadian Atlantic University Sport and determine their perception of the use and value of mental skills training in injury rehabilitation. Athletes participating in Atlantic University Sport were selected for this study as the investigator has a vested interest in Atlantic Universities and at the time of the research was attending a university in Atlantic Canada, thus enabling her to access this population with ease. The following is an outline of the study.

Purpose of the Study

The purpose of this study was: (1) to determine whether AUS athletes use mental skills as a part of their training regimen, (2) to gain a better understanding of the perceived role of mental skills training in injury rehabilitation among varsity athletes in Atlantic University Sport (AUS), (3) to determine AUS athlete's current awareness of how mental skills may be implemented during injury rehabilitation, and (4) to determine AUS athlete's willingness to incorporate mental skills into a future injury rehabilitation program.

Research Questions

Larson, Starkey and Zaichkowsky (1996) reported that in a survey of a large sample of athletic trainers, 47% believed that every injured athlete experiences

psychological trauma. Based on this evidence and the idea that the use of mental skills training may contribute to a more rapid recovery from injury (Izveia and Orlick (1991), Loundagin and Fisher (1993), Brewer et. al., 1994) the following research questions are considered in this study:

- (1) Do athletes use mental skills training to enhance their athletic performance?
- (2) How do athletes perceive the role of mental skills training in injury rehabilitation?
- (3) Do athletes perceive that the implementation of mental skills training during injury rehabilitation would be supported by coaches, team-mates and care givers?
- (4) Are athletes willing to incorporate mental skills training into future injury rehabilitation programs?
- (5) Are athletes being provided with the knowledge necessary to implement mental skills training into injury rehabilitation?

Limitations of the Study

The study is limited in generalizability since the geographic region being examined is limited to universities within Atlantic Canada and to athletes involved with sports that were in season at the time of the research (basketball, volleyball, ice hockey, wrestling and swimming). Some of the respondents of this study had never sustained an injury and thus a portion of the results are based on what they would perceive to be of benefit should they become injured. The instrument, the *Teev Mental Training and Sport Injury Rehabilitation Questionnaire*, was designed specifically by the researcher for this study and would require further research and refinement to further substantiate the instrument as a valid and reliable tool.

Assumptions

The instrument used to measure the perceived role of mental training in sport injury rehabilitation was assumed to be a reliable and valid measure. It was also assumed that respondents honestly answered questions.

Definition of Terms

The following definitions were used in this study:

Mental Skills: For the purpose of this research, mental skills will be defined as specific mental strategies that athletes may use to help them cope with athletic injury or the rehabilitation process. This research will be limited to the athlete's perceptions of the roles of goal setting, positive self-talk, imagery/visualization, relaxation techniques and concentration and focus.

Goal Setting: "Attaining a specific standard of proficiency on a task, usually within a specified time limit" (Williams, 1998).

Positive Self-Talk: "The use of a specific set of verbal cues to assist athletes in keeping their minds appropriately focused on task-relevant cues" (Williams, 1998).

Imagery/Visualization: "Using all the senses to recreate or create an experience in the mind" (Williams, 1998).

Relaxation Techniques: "The ability to regulate different levels of tension to deal with the environment actively and effectively. Techniques may include breathing exercises, progressive muscle relaxation exercises, meditation and autogenic training" (Williams, 1998).

Concentration/Focus: "The ability to focus on relevant cues in the environment, to maintain attentional focus over time and have an awareness of the situation" (Williams, 1998).

Chapter 2

Review of Literature

Introduction

Psychological factors are being increasingly recognized by sports medicine professionals as important when examining issues of injury prevention, precursors to injury, intervention and rehabilitation. Research in the area of sport psychology and athletic injury in the past focused primarily on the psychological factors that may predispose athletes to injury. Researchers studied personality factors in order to understand whether such traits as self-concept, introversion-extroversion and tough mindedness were related to injury susceptibility (Weinburg and Gould, 1999). High stress levels were examined to determine if factors such as attentional disruption and increased muscle tension contributed to injury occurrence (Williams and Anderson, 1998). Other researchers (Cohen and Young, 1981) have considered risk-taking behaviours and injury occurrence. Feltz (1984) studied support systems that may assist athletes in coping with life changes and stress in an attempt to minimize injury.

As a result of the current trend in the health care community, the notion of the mind and body as an integrated system has lead to the further establishment of behavioural medicine and health psychology (Isvieva and Orlick, 1991). As such, research in the area of sport psychology has begun to focus on the emotional and psychological responses and impact of injury on athletes as well as various interventions and strategies that may be implemented to facilitate the often tedious rehabilitation process. The intention of this chapter is to review the existing literature relevant to the

application of mental skills in injury rehabilitation. The review will address issues associated with athletes' emotional and psychological responses to injury and various psychological interventions or mental skills used to enhance the rehabilitation process.

Athlete's Response To Injury

Participation in sport and physical activity assumes a risk of injury. Traditionally, recovery from injury has been a passive, sit-and-wait endeavour (Berryman, 1993) as the physiological aspects of injury and rehabilitation have been the main focus. Research has focused increasingly on the mind-body connection and has suggested that the rehabilitation of the physiological injury may greatly depend on the emotional and psychological status of the athlete following the injury and throughout the rehabilitation period. Several studies have supported the assumption that athletes are affected both physiologically and psychologically by injury. In a survey of 482 certified athletic trainers, 47% reported that they believed injury affects athletes both psychologically and physiologically and recognized the need to address both aspects during rehabilitation (Larson, Starkey and Zaichkowsky, 1996). In a similar study of 90 physiotherapists in the United Kingdom, 90% reported that sports injuries affected athletes psychologically as well as physically (Hemmings and Povey, 2002).

Based on existing work recognizing that injury affects athletes both physiologically and psychologically, research has been initiated to examine the varied responses athletes have following an injury. Injury among elite athletes may cause a profound change in lifestyle (Heil, Wakefield and Reed, 1998), as elite athletes are required to dedicate a substantial amount of time to their sport. Many athletes train daily, enhancing their bodies and minds in hopes of gaining physical, technical, tactical and

mental advantages over their competitors. When confronted with the unfortunate circumstance of injury, athletes may have a spectrum of psychological and emotional responses. The basic implication that exists in theories examining athlete's response to injury is that athletes manifest different reactions to injury and may exhibit these reactions at variable times (Wiess and Weiss, 1987). Although the majority of athletes tend to cope well with injury, reactions have been reported to vary from mild annoyance to devastation (Cornelius, 2002). It has been suggested that the extent of psychological disturbance in injured athletes varies with the attributes of the athlete and the context in which the injury occurred. Situational factors such as the nature and severity of the injury, the time of season the injury occurred and the perceived context of the injury (cheap shot versus accidental) may influence the athlete's reaction (Wiess and Weiss, 1987). In addition to situational factors, Sanderson (1981) cited such personality dimensions as extraversion/introversion, neuroticism/stability, history of stressors, coping resources and experience with previous injury as contributing to athlete's emotional responses to injury.

Research has indicated that a wide variety of emotional and physical reactions have been found to accompany athletic injury. Weiss and Troxel (1984) reported disbelief, fear, rage, depression, tension, fatigue, upset stomach, insomnia and loss of appetite as being associated with emotional response and physical reaction to injury. Sims (1998) reported temporary loss of identity, loss of social role, decreased self-esteem, poor use of time and strained personal relationships due to anger and frustration as reactions to injury. Crossman (1997) found frustration, depression and anger to be the three primary emotions exhibited by athletes following injury, and to a lesser extent found

that athletes also felt irritable, miserable, discouraged and uncomfortable. Furthermore, athletes struggled with the changes to their daily routine (increased amounts of free-time), felt distant from healthy team mates and the coaching staff, and felt that their emotions caused anxiety and tension impeding recovery. Loss of status, fear of not performing to pre-injury levels upon return, fear of re-injury and fear of not being able to fully regain their fitness levels were also reported. Brewer, Van Raalte and Linder (1991) and Hemmings and Povey (2002) both reported stress, anxiety and exercise addiction as the most frequently observed behaviours following athletic injury. Larson et al (1996), in their survey of athletic trainers found that 71% of trainers reported that stress and anxiety were visible in athletes following injury. Smith, Scott, O'Fallon and Young (1990) reported that seriously injured athletes exhibited significantly more tension, depression and anger, and less vigour than college norms or athletes sustaining less serious injuries. Research supports the notion that athletes are affected both physiologically and psychologically by injury.

Based on the findings that have indicated that athletes respond and react to injury in varying degrees and display a broad range of emotions, researchers have proposed theories to further explain athlete's responses to injury. One of the first theories was the classic Kubler-Ross (1969) Grief Model. This model was created to explain reactions to the loss of a loved one and also to explain the reactions of the terminally or seriously ill. The model consists of five stages: (1) disbelief, denial and isolation, (2) anger, (3) bargaining, (4) depression and (5) acceptance. Sport psychologists (Lynch, 1988; Pedersen, 1986, and Reicella, 1984) suggested that athletes experience a sequence of predictable psychological reactions following an injury similar to those outlined in the

Grief Model. Athletes may experience loss of physical functioning, loss of identity, or loss of socialization with members of their team. Lynch (1988) explained that athletes alternate between these stages until acceptance is achieved, however, this model has not received a great deal of empirical support (Williams, Rotella and Heyman, 1998). Cornelius argued that the reactions of the terminally ill and those grieving from the loss of a loved one are not the same as an athlete's reaction to injury, as athletes generally have every intention of returning to their sport once the rehabilitation process is complete. Smith et al., (1990) used the *Emotional Response of Athletes to Injury Questionnaire* (Smith et al., 1990) and the *Profile of Mood States* (1971) to study the emotional responses of seventy-two injured athletes from the onset of injury to their return to sport. The results indicated that athletes exhibited initial feelings of frustration, depression, tension and anger; however, these responses did not fluctuate in a stage like manner. Athletes overall mood disturbance was maintained at some level for approximately one month following the injury after which moods appeared to return to normal levels.

Brewer et al. (1994) used one of the *Cognitive Appraisal Models* to explain athlete's emotional responses to injury. They argued that the *Grief Model* did not account for individual differences in response to athletic injury and maintained that an athlete's response to injury comes not from the injury itself, but rather from the athlete's interpretation or perception of the injury. The *Cognitive Appraisal Models* consider personal factors (dispositional and/or historical attributes) and situational factors (injury-related and social or physical environment characteristics) and based on these, cognitive appraisal (interpretation of the injury), emotional response (anger, depression, relief) and behavioural response (extent of adherence to rehabilitation regimens) are determined.

Heil's (1993) *Affective Cycle Theory* states that the emotions or behaviours associated with injury may be viewed as a repeated three-element cycle including distress, denial and determination to cope. Distress and denial tend to peak in the early stages of rehabilitation and then give way to increasing amounts of determined coping toward the end of the rehabilitation process. However, Heil included that distress and denial may reappear throughout the rehabilitation process in response to difficulties (pain, lack of progress). Cornelius (2002) states that this Affective Cycle Theory which is an outgrowth of the Kubler-Ross Grief Model has not been tested directly and requires additional empirical support.

The manner in which athletes interpret their injury has been associated with emotional responses and reactions. Lynch (1988) used the analogy of the Chinese word for crisis, which means two things at the same time: danger and opportunity, to explain his position on interpretation of athletic injury. Translated, the Chinese word for crisis means opportunity blowing on a dangerous wind. This analogy implies that with every injury comes a degree of danger or warning that requires an athlete's attention. Also, injury presents an opportunity that when realized, may help the injured athlete reform on the positive aspects of the situation. Lynch encourages sport psychologists to help injured athletes discover both sides of their crisis.

Heil (1993) also discusses how athletes choose to interpret their injuries. He lists the following among common interpretations of athletic injury: (1) the injury as a challenge to overcome, (2) the injury as a relief as the athlete no longer has to live up to high expectations, (3) the injury as punishment for past actions, (4) the athlete feels as though they will never be able to perform again, (5) as a means of manipulation with the

intent of gaining attention, (6) as an opportunity to take care of other responsibilities, and (7) as an opportunity to comeback stronger and more effective. Sims (1998) noted that several of the above-mentioned interpretations are positive in nature and should be emphasized through cognitive restructuring as they may contribute to successful rehabilitation outcomes. A study by Udry, Gould, Bridges and Beck (1997) on injured skiers revealed the following interpretations that are not ordinarily recognized: (1) gaining new perspectives on life, (2) personality changes for the better, (3) character development, (4) enhanced self-determination, and (5) physiological and emotional awareness.

It seems obvious that it is important to individualize mental training and psychological interventions to meet athlete's individual needs (Wiese, Weiss and Yukelson, 1991). It has been acknowledged by Hemmings and Povey (2002), Larson et al. (1996), Brewer et al (1991) and Wiese and Weiss (1987), that sports medicine professionals have expressed a need and desire to learn more about psychological skills in order to enhance their understanding and facilitate their prescription of rehabilitation programs. When sport injury does occur, sports medicine professionals should be prepared to assess the psychological effects of injury and help the athlete cope with adversity or make an appropriate referral when necessary (Smith, 1996).

Interventions

Hemmings and Povey (2002) recommend that an effective and successful treatment program include the comprehensive assessment of athletic injury approached in a holistic manner aiming to treat both the psychological and physical conditions that exist. In many cases of athletic injury, athletes are provided with a rehabilitation program in the

traditional confines of the medical model that does not include a mind-body orientation (Green, 1992). Psychological interventions have been viewed in the past and to a lesser extent in the present with scepticism. For example, in a study of college athletes it was indicated that mental health services were generally underutilized (Bergandi and Wittig, 1984 as cited by Brewer, Jeffers, Petipas and Van Raalte, 1994). This in part may be due to the social stigma that seems to accompany mental illness and the concept of seeking help. Crossman (1997) cited that injury among male athletes is often interpreted as a sign of weakness by the athletes themselves or by team-mates and coaches. Considering this interpretation, it is not difficult to see how psychological interventions and mental skills training might be viewed with scepticism as the stereotypical scenario of males who need or want help, may still be viewed as a sign of lesser masculinity. Brewer et al. (1994) found that females may be more receptive to sport psychology interventions than males; and that college students particularly females, held positive perceptions of psychological interventions in the context of injury rehabilitation.

Psychological interventions have been recommended to enhance the psychological well being of athletes, to increase adherence to rehabilitation programs and to facilitate physical rehabilitation (Brewer et al., 1994). Cupal (1998) has recommended that psychological interventions be used as adjuncts to physical rehabilitation and that positive relationships be created between medical professionals and sport psychologists. However, it has been stated that without confidence in the proposed treatment program, psychological interventions are unlikely to be effective (Brewer et al., 1994). Cupal (1998) reported that psychological interventions demonstrated positive outcomes for improved physical and psychological well-being. Furthermore, athletes who used

psychological skills saw themselves as active participants in the recovery process. Ievleva and Orlick (1991) surveyed fast and slow healing athletes and found that the faster healing group believed that they had direct control over the healing process.

Capal (1998) reported the main goal of psychological intervention as identifying the cost of injury to the athlete and providing them with the appropriate rehabilitation strategies. Sims (1998) stated that mental training is incorporated to help injured athletes comply with the rehabilitation program and to provide the tools necessary for positive and successful return to sport. Brewer, Van Raalte and Linder (1994) recommend that the psychological status of the injured athlete be assessed to determine if psychological intervention to promote emotional adjustment is needed.

Exploring all the factors in the psychological assessment of athletes is beyond the scope of this review, however it would seem important to consider the individual circumstances of each athlete. Pettipas and Danish (1994) suggest that the following five factors be taken into consideration: (1) severity of injury, (2) onset of injury, (3) course of injury, (4) history of injury, and (5) type of injury. Cornelius (2002) mentions the importance of considering the coping skills athletes possess, as this may determine injury experience and directly effect the reaction and ability of the athlete to deal with the rehabilitation process. Finally, Brewer et al. (1994) found that athletes with strong and exclusive identification of their roles as athletes suffered more serious depressed moods following injury than athletes with less investment in their roles as an athletes.

Once the athlete's emotional and psychological status has been assessed and it is determined that the athlete may benefit from an individualized psychological intervention program, research has demonstrated that communication and education about the injury

should be the first intervention (Wiese and Weiss, 1987). At elite levels of competition, the trend seems to be to return injured players to competition as quickly as possible. The pressure and stress to return to competition does not always facilitate the rehabilitation process and often finds the athlete returning to their sport lacking confidence and being at an increased risk of re-injury. Because athletes usually do not have the knowledge to diagnose their injuries and prescribe their treatment, injury may cause extreme anxiety, causing athletes to search for structure and direction (Nideffer, 1997). Injured athletes should be provided with a detailed description of the nature of their injuries to ensure that they are fully aware. Included, should be an honest summation of the severity of the injury and implications (expected time away from competition) and expectations of the rehabilitation program (Grove and Gordon, 1995). Crossman (1997) cites that the athlete's realistic appraisal of his or her injury is important to successful rehabilitation outcomes. Simonton and Simonton (1984) as cited in Ievleva and Orlick, (1991), report on the importance of understanding the injured athlete's belief structure in order to best fit a program to meet their needs and values. Attitude and outlook are thought to play a paramount role in influencing the injury recovery process and are also considered critical in rehabilitation (Ievleva and Orlick, 1991). Furthermore, Brewer et al. (1994) found that the effectiveness of interventions such as goal setting, use of imagery and counselling depended on how the interventions were viewed by the athletes. Therefore, based on the communication and education of the athlete concerning their injury, possible course of injury rehabilitation and the athlete's reaction and coping ability, it would seem important that the appropriate psychological interventions be implemented.

The development of the sport psychology field has led to various practices and principles being applied to diverse groups (business executives, military, police, performing artists) with the goal of improving performance. Sport psychology is based on an educational model emphasizing the development of skills through psychologist or counselor directed training and athlete directed practice (Heil, Wakefield and Reed, 1998). Research supports the use of psychological training interventions and their positive association with improved performance (Greenpan and Feltz, 1989). More recently, research has indicated success in the application of various psychological training interventions or mental skills to injured athletes throughout the rehabilitation process. Iervleva and Orlick (1991) and Leondagin and Fisher (1993) cited that using cognitive techniques that promote positive self-talk and a positive attitude in athletes may shorten the recovery time. Capal (1998) found that athletes who used psychological skills saw themselves as active participants in the recovery process. Heil et al. (1998) found that mental rehearsal techniques could be used to help athletes anticipate or deal with challenges that may arise during rehabilitation.

Yogi Berra once stated, "Sport is 50% physical and 90% mental." This may be equally true of injury rehabilitation. Heil et al. (1998) found that athletes who were emotionally intense and who had access to sensible and scientifically grounded knowledge about their rehabilitation were most likely to make remarkable recoveries. In order for the various psychological interventions or mental skills to be effective, athletes must create an appropriate mind-set. Green (1992) stressed the importance of an athlete rehabilitating from injury accomplishing the task of getting rid of a mindfull of negative and counterproductive thoughts (fear of re-injury, fear of pain, fear of not returning to

previous levels of ability, loss of status). Athletes must learn to redirect their focus, attention and energy from competition to rehabilitation and recovery.

A broad range of psychological interventions or mental skills exist to complement sport injury rehabilitation programs. Early intervention research focused on biofeedback, electromyographic feedback and systematic desensitization. Intervention research in more recent years has expanded to focus on the use of imagery and visualization, relaxation techniques, stress inoculation training, and goal setting (Cupal, 1998). Brewer et al. (1994) found that the three interventions most commonly suggested for use in the context of sport injury rehabilitation were goal setting, imagery and counselling. Larson et al. (1994) found that the top five intervention strategies reported by athletic trainers were: (1) keeping the athlete involved with the team, (2) using short term goals, (3) encouraging positive self-thoughts, (4) including variety in rehabilitation exercises and (5) the use of effective communication. Cupal (1998), in a review of psychological intervention studies reported that athletes expressed preference for and responded favourably to interventions such as relaxation techniques, imagery and goal setting. Iervleva and Orlick (1991) in their landmark study of 39 athletes who had recovered from injury and undergone injury rehabilitation, reported that positive self-talk, goal setting and healing imagery were most closely associated with fast healing. Himmerings and Povey (2002) in their study of physiotherapists found that the interventions most used in sport injury rehabilitation were the inclusion of variety in rehabilitation exercises, using short term goals and encouraging positive self-talk. They reported the interventions used the least as being the reduction of depression, teaching emotional control and improving social support. Wiese et al. (1991), in a study of athletic trainers found specific

psychological skills (interpersonal communication, positive reinforcement, continued team involvement and realistic goal setting) important factors in facilitating an athlete's ability to cope with injury.

The following specific mental skills are now examined in some detail: goal setting, imagery/visualization, relaxation techniques, positive self-talk/affirmations and concentration/focus.

Goal Setting

Goal setting has been shown to influence the performance of athletes of many different ages and abilities as well as contribute to positive changes in psychological states including anxiety, confidence and motivation (Gould, 1998). In a review of over one hundred studies on goal setting, Locke, Shaw, Saari and Latham (1981) found that ninety percent of studies demonstrated positive or partially positive effects. It may therefore be stated that based on psychological research, goal setting is a powerful tool for enhancing performance (Gould, 1998).

Goal setting is among one of the most commonly suggested interventions for use in sport injury rehabilitation. In the context of sport injury rehabilitation, goal setting has been found to foster realistic expectations, to encourage progress and to help offer a realistic, positive vision of the future (Heil et al., 1998). Crossman (1997) reported the value of goal setting in improving task performance. In addition, goal setting has been said to motivate injured athletes to channel their energy toward achievement of rehabilitation objectives and instill a degree of control (Berger et al., 1991). It has been recommended that injured athletes and rehabilitation professionals collaboratively establish rehabilitation goals so that athletes are actively involved in the goal setting

process (Brewer et al., 1994 and Williams et al., 1998). Both short and long-term goals should be set for recovery, return to practice and competition and for day-to-day rehabilitation (Istivira and Orlick, 1991). Brewer et al. (1994) proposed that the preference for goal setting as a means of intervention among injured athletes may suggest that setting goals is a more natural part of an athlete's routine and therefore may be easily transferable to rehabilitation. In addition, goal setting is a more concrete activity than the practice of imagery or visualization and thus may be viewed more acceptingly. Goal setting is a common, day-to-day activity for many people and thus may be an important transferable skill that athletes would feel comfortable implementing in their rehabilitation programs.

Imagery/Visualization

Imagery is a mental technique that programs the mind and body to respond optimally. Imagery is a form of simulation, similar to a sensory experience, however, the entire experience unfolds in the mind (Weinberg and Gould, 1999). By using imagery, athletes have a tool that enables them to see and believe, thus giving them confidence and focus to perform in a successful manner (Vealey and Greenleaf, 1998 as cited in Williams, 1998). Although imagery is most often used in the re-creation of successful experiences, imagery may also involve creating images that have not yet occurred based on images from several parts of memory. Imagery may take the form of an internal or external view. The internal view provides the feeling of performance, whereas the external view provides a picture that facilitates the correction of errors (Syner and Connolly, 1984 as cited in The National Coaching Certification Program Manual, Level Three, 1990). It is critical to successful imagery that as many of the senses as possible be

incorporated into the image. This helps create a vivid and realistic image. In addition to the senses, imagery should include the thoughts, feelings and emotions associated with the experience to help the athlete elicit the appropriate level of arousal. Athletes using imagery as a mental tool should keep the images positive in focus, they should image in real time making sure that all images are carried out in a complete manner, including the execution and outcome of the experience (Weinberg and Gould, 1989).

In the context of sport injury rehabilitation, imagery/visualization has the purpose of facilitating the healing process, promoting the development of a positive and relaxed outlook toward recovery, creating a mind set required for optimal performance and bringing closure to the injury experience (Green, 1992). Brewer et al. (1991) reported that mentally rehearsing desired rehabilitation outcomes (healing, return to sport, execution of skills) accompanied by relaxation, helped to promote healing, enhance motivation, reduce stress and cope with pain. Research has indicated that when imagery and relaxation techniques were implemented during anterior cruciate ligament (ACL) reconstruction rehabilitation, athletes experienced greater gains in strength, decreased occurrence of re-injury, decreased levels of state anxiety and had a quicker return to activity (Cupal, 1996). Brewer et al. (1994) reported that rehabilitation with some form of imagery was found to be more effective in influencing the extent of healing than rehabilitation alone. Sparrow and O'Hara (1990) reported that imagery was shown to be effective in coping with pain. Lynch (1988) discussed how the use of imagery/visualization helps to eliminate destructive and stressful images that may cause vasoconstriction and inhibit healing. The elimination of negative emotions through imagery/visualization allows normal blood flow to resume, relaxing muscles and

facilitating healing. Ievleva and Orlick (1991) indicated that positive images of healing and images of full recovery are recommended for mobilizing one's own healing powers inside and outside of sport. Heil, Wakefield and Reed (1998) suggested that injured athletes and their rehabilitation professionals construct rehearsal scenarios that identify specific rehabilitation problems as seen by the athlete. Athletes should then embellish these images with multisensory language (sight, sound, kinesthetic, feel) and use imagery to play out successful outcomes. Finally, Rotella and Heyman (1990) recommended using video footage of past performances to help athletes reinforce clear images as they visualize in preparation of their return to sport or activity.

Relaxation

Excess anxiety and stress can produce inappropriate muscle tension, which in turn may have adverse effects on performance and may also produce inappropriate thoughts and cognitions (Weinburg and Gould, 1998). Athletes tend not to achieve their best when they are too tight, anxious, tense or stressed out. The problem is often a consequence of losing perspective, focus or mental control (Orlick, 2000). In order to control or regain a sense of appropriate relaxation, various techniques have been suggested that may focus on the reduction of somatic anxiety, cognitive anxiety or a combination of the two. One of the most commonly used methods of reducing or controlling somatic anxiety is through the use of Progressive Muscle Relaxation (Jacobson, 1938). This technique involves tensing and relaxing muscles from one muscle group to the next until all major muscle groups are relaxed. Other common methods of somatic or physiological relaxation include breath control and biofeedback. Orlick (2000) cites the following as physiological responses to relaxation techniques: decreased heart rate, decreased and

more regular breath rate, decreased oxygen consumption, decreased muscle tension and an overall feeling of calmness in the body. Orlick also states the main psychological or cognitive response to relaxation as a shift in focus away from the stressor that caused initial tension or anxiety to focusing on the feeling of relaxation or other appropriate constructive feel. Common techniques for the reduction of cognitive anxiety or stress include the relaxation response (Herbert Benson, 1984), autogenic training, or the use of relaxing imagery/visualization (Weinburg and Gould, 1998). Loundagen and Fisher (1993) reported that the practicing of any relaxation techniques may play a potential role in reducing stress and speeding injury rehabilitation and recovery. This finding may be explained by the following: (1) Relaxation helps to open the mind-body channels that regulate the body, thereby enabling inner control over the body (Botterhill, Flint and Ievleva, 1996). (2) Tension that often occurs in the injured area may increase pain and work against the effectiveness of rehabilitation exercises by reducing blood flow and range of motion. Practising a relaxation technique may relieve tension and enhance blood circulation to the injured area, aiding in the faster healing of injured tissues (Ievleva and Orlick, 1993). (3) Using relaxation techniques to help control the high levels of stress often reported in association with sport injury (Larson et al., 1996) may help athletes to cope more effectively (Crossman, 1997).

Positive Self-Talk/Affirmations

Thinking effectively is critical to performance. Inappropriate or misguided thinking usually leads to negative thoughts and poor performance, just as positive thinking leads to enabling thoughts and good performance (Dorel, 1988; Kendall, Hrycaiko, Martin and Kendall, 1990). Self-talk plays a pivotal role in cognitive control.

Self-talk is an asset to athletes when it helps them enhance self-worth, stay appropriately focused in the present, and ultimately leads to success in performance. Conversely, negative self-talk can interfere with success when it distracts from the task or disrupts automatic performance of skills. Furthermore, self-talk becomes especially destructive when athletes evaluate their performance and then label or rate themselves in a negative manner (Zinsser, Bunker and Williams, 1998). Changing negative self-talk to positive self-talk begins with being aware of the harmful thought, stopping the thought and having the ability to reform it in a positive manner (Weinberg and Gould, 1998).

An affirmation may be described as a strong, positive statement implying success. It is a way of confirming that of which we are imaging. Our minds are constantly engaged in inner dialogue that at times may not be positive or beneficial. The act of engaging in affirmations allows us to begin replacing unproductive thoughts with more positive ideas or concepts (Curwin, 1985).

In the context of sport injury rehabilitation, it has been stated that the belief systems of injured athletes may hinder the healing process or facilitate recovery. By recognizing self-defeating inner dialogues and replacing these with more positive ones, athletes may change their beliefs about their injury, become more action focussed and progress more rapidly in the healing process (Ivleva and Orlick, 1991). Porter and Foster (1990) report that having a positive dialogue with one's body while undergoing rehabilitation may enhance healing. Athletes are unable to change the fact that they have suffered an injury, but they can control their thoughts about the injury. The use of positive self-talk may help athletes recognize negative or damaging thoughts and aid in

refocusing the athlete on the positive aspects of their training and provide them with a greater sense of control over their injury (Cornelius, 2002).

Concentration and Focus

An athlete's ability to focus and concentrate during competition often helps to determine whether an elite performance will occur (Chambers, 1997). Concentration is the ability to maintain focus on relevant environmental cues. This state of concentration should be a natural, relaxed state of mind that allows athletes to receive and interpret relevant information (Weinburg and Gould, 1998). Athletes should not have to strain to pay attention, but rather have the ability to change focus quickly and maintain flow. It is important for athletes to have the ability to adjust attentional focus with rapidly changing environments, as well as to stay in the moment, because thinking of the past or future may raise irrelevant cues that may often lead to error, hindering performance of the task at hand (Nideffer, 1979 as cited in The National Coaching Certification Program Manual, Theory Level Three, 1990).

There is little research specific to the role that concentration and focus play in sport injury rehabilitation. However, as previously mentioned, the athlete's mind-set and ability to redirect attention from competition to focus on the rehabilitation process would seem to be paramount for a successful outcome. Nideffer (1997) studied the ability of injured athletes to follow medical advice. Using the Attentional and Interpersonal Style (TAIS) inventory, concentration skills and interpersonal characteristics were measured considering the five following factors or clusters: competitiveness/self-confidence, gathering and assimilating information, involvement with others, decisions under pressure and focus and follow through). Nideffer reported that factor five of the TAIS, focus and

follow through, indicated that high scorers exhibited a great deal of mental and emotional control and the ability to stay focused and have excellent follow through during the rehabilitation process. Low scorers on the TAMS tended to be emotionally impulsive and easily distracted. Clearly the research on concentration and focus is limited in scope and further investigation is required.

Conclusion

In conclusion, research supports that athletes are affected psychologically by injury. Psychological interventions or mental skills have recently gained support for their role as adjuncts to both performance enhancement and sport injury rehabilitation programs. The interventions have indicated positive outcomes resulting in improved physical and psychological well-being among injured athletes. For optimal rehabilitation from sports injury, a multidisciplinary approach has been found to be of benefit (Laskowski, 1999). Treating injured athletes in a holistic manner, addressing both the mind and body has been associated with a faster and more prepared return to activity. The empirical research exists to support the notion of psychological intervention in injury rehabilitation.

Research has examined the factors that may predispose athletes to injury, athlete's psychological and emotional responses to injury and the implementation of mental skills in injury rehabilitation. Based on these results, the field of sport psychology and injury rehabilitation has grown and provided a great deal of insight into these areas. However, very little research has been done exploring whether athletes actually have access to mental skills and their perceptions of the role mental skills play in injury rehabilitation. The scope of this study is exploratory in nature and seeks to determine whether athletes

have access to mental skills programs and athletes' perceptions of the role of mental skills in the context of sport injury rehabilitation.

Chapter 3

Methodology

This study examined the perceived role of mental skills training in injury rehabilitation among varsity athletes competing in Canadian Atlantic University Sport. The purposes of this exploratory study were to determine (1) whether athletes were aware of how mental skills may be implemented during injury rehabilitation, (2) whether athletes use mental skills as part of their regular training regimen, and (3) athletes' willingness to incorporate mental skills into future injury rehabilitation programs. As no previous instrument could be located to measure these phenomena, the *Trew Mental Training and Sport Injury Questionnaire* was constructed by the investigator.

A single group, single observation design was used to explore athletes' perceptions of the role of mental skills training in injury rehabilitation. Each athlete involved in the study completed a copy of the same questionnaire. Gender differences were examined to determine if males and females differed in their perception of the role of mental skills training in injury rehabilitation.

This chapter outlines the methodology used in this study including the population sampled, the instrument's development, the pilot study, the instrument's reliability and validity, the main study and methods of data analysis.

Measures

Instrument Development

The questionnaire was developed by the investigator, since no previously developed questionnaires could be located that measured the perceived role of mental

skills training in injury rehabilitation. Literature pertinent to the area of interest was reviewed, as were existing questionnaires from various fields to help the investigator gain a broader understanding of the nature and diversity of possible items to include in the questionnaire.

A questionnaire was designed, as questionnaires are a practical and economical method for collecting data, enabling the researcher to reach a large population. The subject matter addressed in this study lent itself to a questionnaire design as anonymous completion made it possible for athletes to express their feelings in writing in a non-threatening manner. Based on the level of education of the target population and their probable interest in the topic of the questionnaire, the response rate was expected to be high (Neuman, 2003).

Following the development of the questionnaire, it was reviewed by five professors familiar with questionnaire design as well as two varsity coaches. The above-mentioned panel of individuals were asked to critically review the questionnaire considering the following factors: (1) length, (2) clarity of the directions, (3) clarity or ambiguity of the questions, (4) specificity and validity of the questions, (5) potential objection to answering any of the questions, (6) attractiveness and clarity of the layout and (7) syntax, typographical or grammatical errors. This review prompted revisions to questions that appeared unclear, confusing or inappropriate. Minor grammatical errors and corrections to the consistency of terms used in the questionnaire were made. Once the revisions were completed, the questionnaire and research proposal were submitted to the Memorial University of Newfoundland Interdisciplinary Committee on Ethics in

Human Research (HCEHR) for approval. Once approval was granted, a pilot study was conducted.

Pilot Study

Respondents

As the measure was designed by the investigator, it was deemed necessary to conduct a pilot study to determine reliability. Students enrolled in an undergraduate university course participated in the pilot study. Students who participated in the pilot study were chosen because of accessibility and convenience. On the first administration of the questionnaire, 46 students (male $n = 48$ and female $n = 18$) with a mean age of 20.8 years completed the questionnaire. On the second administration of the questionnaire, 52 (79%) students (male $n=38$ and female $n=14$) with a mean age of 21.1 years completed the questionnaire. Thirty-three (63%, $n=33$) students, deemed as elite athletes by the investigator completed the questionnaire on both the first and second administrations.

Procedure

The investigator sought and received permission from a university instructor to visit a class and provide students with an opportunity to participate in the pilot study. During the visit, the investigator read from a prepared script explaining that she was conducting a study examining the perceived role of mental skills training in injury rehabilitation and explained what participation in the pilot study would entail. The investigator made it clear that participation was voluntary and anonymous and that it would require that respondents complete the questionnaire on two separate occasions. The investigator thanked the respondents in advance and then distributed the questionnaire to all in attendance. Respondents were advised to remain seated until all

questionnaires had been completed as to maintain the anonymity of those who chose not to participate. Respondents were asked to read the attached consent form (Appendix A) before answering the questionnaire and also asked to complete a critique form (Appendix B) upon completion of the questionnaire. Respondents identified themselves by the student identification number assigned to them by the university. A method of identification was needed to code the first and second administrations of the questionnaire so that tests of reliability could be completed. The investigator did not have access to the student data base and could not match student numbers to individuals. Respondents were asked to indicate their highest level of competition in sport, as only data from respondents deemed to be elite athletes were used to calculate correlating coefficients for test-retest reliability. Elite athletes were identified by their response to categorizing themselves from the following list: (1) Recreational, (2) High School, (3) Provincial Championships, (4) Atlantic/Eastern Canadian Championships, (5) University, (6) National Championships, (7) International and (8) Other. Athletes considered elite for the purposes of this pilot study participated at Provincial Championships, Atlantic/Eastern Canadian Championships, University, National Championships or International level. Thirty-three ($n=33$) students were identified as elite and completed the questionnaire on both the first and second administrations. Twenty-six ($n=26$) were male and seven ($n=7$) were female, with a mean age of 20.5 years. All respondents who completed the questionnaire during both administrations were asked to critically review the questionnaire considering the same eight factors as the expert panel.

The first administration of the questionnaire and critique form took an average of fourteen minutes to complete. Some minor typographical errors were identified and

noted. The wording of one question was clarified before the next administration. The questionnaire was re-administered one week from the original administration following the same protocol as previously described.

Reliability

Reliability measures refer to the consistency or repeatability of test scores or data (Berg and Latin, 1994). The test-retest method was used with the questionnaire, as it was administered to the same group of participants on two separate occasions. A period of one week between test administrations was deemed appropriate based on the notion that respondent's level of knowledge or experience would not have changed greatly, respondent's attitudes and values would not have changed greatly and respondents would probably not recall the questions and their answers within this time period (Husted and Lacy, 1998).

Cronbach (1951) alpha reliability coefficients were calculated for three sections of the Trew Mental Training and Sport Injury Questionnaire. Section one had a reliability coefficient of 0.87. Section two had a reliability coefficient of 0.85, while Section three had a reliability coefficient of 0.55. Dyer (1995) provides approximate translations of values of correlation coefficients. Alphas between 0.8 and 0.9 are said to have a very strong to strong correlation, while alphas between 0.5 and 0.6 are said to have some degree of correlation. All coefficients were considered satisfactory in order to proceed with further data collection.

Validity

Validity is the extent to which a test measures what it purports to measure (Berg and Latin, 1994). Content validity of the Trew Mental Training and Sport Injury

Questionnaire was determined through a review by five professors and two varsity coaches. This panel of experts was chosen based on their expertise in research and coaching. Although there is no statistical value related to this content validity, it is stronger than face validity because it employs both logic and expert opinion (Berg and Latin, 1994). The panel of experts received a cover letter outlining the purpose and intent of the study and a critique form (Appendix C) requesting feedback on the previously mentioned eight factors, as well as the consent form and overall layout of the questionnaire. The expert panel was primarily directed to review the questionnaire and offer opinions on each question's specificity and validity.

After reviewing the recommendations from the panel of experts, the investigator and academic supervisor made revisions to the Trew Mental Training and Sport Injury Questionnaire. Due to the preliminary nature of this exploratory study, additional research will be needed in order to further substantiate the measure's value as an effective tool for investigating the role of mental skills training in injury rehabilitation.

Main Study

Respondents

The respondents of this study were female and male athletes from Canadian Atlantic University Sport, competing in sports that were in progress at the time of this study. Athletes were a minimum of eighteen years of age and were enrolled in universities located in the following provinces: New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland. The athletes ranged in Canadian Interuniversity Sport eligibility from first to fifth year and participated in the following sports: women's basketball, men's basketball, women's volleyball, men's volleyball, men's ice hockey,

men's swimming, women's swimming, men's wrestling and women's wrestling. The contact information for each coach was obtained from the Atlantic University Sport Directory, 2002/2003.

Procedure

It was decided that it would be beneficial to have coaches assist in the distribution of questionnaires in an attempt to minimise costs, to encourage response in a timely manner and to achieve a higher response rate than might be achieved by direct mailing. Forty-three (N=43) coaches of teams active at the time of the study were initially contacted by e-mail to request that they provide an opportunity for their athletes to participate in the study. The investigator identified herself as a graduate student completing Master's degree requirements. The investigator explained the purpose and intent of the study and mentioned that at no time would the name of any athlete or the name of their university be requested or used. A consent form and questionnaire was provided to give coaches an opportunity to review what was entailed prior to participation. From this initial e-mail, eight (n=8) coaches responded by e-mail expressing their willingness to participate in the study.

One week following the initial e-mail, an attempt was made to contact, by telephone, coaches who had not responded in order to determine their willingness to participate (n=35). Voice mail messages were left with coaches who could not be contacted in person (n=12). Of the thirty-five coaches who were eventually contacted by telephone and offered an opportunity to participate in the study, seventeen (n=17) were willing to participate in the study, one was not willing to participate and twenty-six (n=25) coaches did not respond to the initial e-mail enquiry or telephone message. In

order to provide the twenty-six coaches who did not respond an opportunity to participate in the study, the investigator decided to forward all information to them through the mail.

A package was sent, via mail, containing a letter of introduction with directions for administering the questionnaire to athletes (Appendix D), consent forms and questionnaires (Appendix E), business size envelopes for each athlete, and a large self-addressed, stamped envelope for the return of completed questionnaires. A total of forty-two ($n=42$) packages were mailed.

The letter of introduction explained the purpose and intent of the study, ensured anonymity and confidentiality, encouraged coaches to administer the questionnaire at their convenience and provided coaches with contact information on the investigator's academic supervisor and the Interdisciplinary Committee on Ethics in Human Research (ICEHR), should they have any concerns. Instructions for the administration of the questionnaire were included. Coaches were asked to distribute the consent form and questionnaire and a business sized envelope to each athlete at a team meeting. Coaches were asked to instruct athletes to read the consent form and questionnaire carefully and regardless of whether or not they chose to complete it, to return the questionnaire to their coach in the sealed envelope. Returning completed questionnaires was considered as an expression of consent. Coaches were asked to leave the area while athletes completed their questionnaires.

Ten days following the mailing of the packages, the forty-two coaches were sent an e-mail to confirm they had received their package and to provide a reminder for the return of questionnaires. Several coaches responded to the e-mail indicating that the questionnaires were in the mail or that they planned to administer them in the near future.

One week following the initial reminder, a second reminder of the same nature was sent. Thank you acknowledgments were then sent to all coaches who had responded.

Due to the procedure to ensure anonymity and the confidential nature of this study, it is difficult to determine an exact response rate. A total of 700 questionnaires were sent, with each sport receiving a predetermined number. For example, each hockey team received 25 questionnaires regardless of the number of athletes on their roster; each basketball team received 16 questionnaires. A total of 290 questionnaires were completed and returned with an approximate response rate of 41.5%.

Data Analysis

Coding

Completed questionnaires were coded by the investigator and entered into a data file in the Statistical Packages for the Social Sciences (SPSS, 2001) program, Windows version 11.0. To minimize human error in the data entry process, the investigator entered all items into the file and then a colleague verified each entry by matching the questionnaire responses to the entered data.

A numerical value was assigned for each response. For example, "yes" was assigned the value 1 and "no" was assigned the value 2. Likert-type scales were assigned the actual value that was selected by the participant and entered as such. The values were as follows: 1 for "strongly disagree", 2 for "disagree", 3 for "disagree somewhat", 4 for "neutral", 5 for "agree somewhat", 6 for "agree", and 7 for "strongly agree". Missing values were identified.

One short answer question queried athlete's responses to the role mental skills play in injury rehabilitation. The answers were examined for themes and summarized.

Statistical Analysis

Demographic data were treated with descriptive statistics. Measures of central tendency (mean), measures of variability (range and standard deviation) and measures of distribution shapes (frequency distributions and cumulative frequencies) were used where appropriate. The investigator used frequency counts, percentages, means and standard deviations as descriptors for numeric valued ordinal variables. Chi squared was calculated to determine whether athletes who believed that mental skills training enhances athletic performance also believed that their coaches, caregivers and team-mates would encourage them to use mental skills training in injury rehabilitation. All of the results were generated using SPSS and analysis of the data was based on the exploratory nature of this study. The following chapter provides an analysis of the data.

Chapter 4

Results and Discussion

This study examined the perceived role of mental skills training in injury rehabilitation among varsity athletes in Atlantic Canada. The nature of this exploratory study differs from previous studies, as the intention of this study was to present the thoughts and opinions of AUS athletes about the use of mental skills training in injury rehabilitation. The collected data provide information that may be of assistance in helping coaches, athletic trainers and mental training consultants develop programs and services that will aid them in incorporating mental skills training into injury rehabilitation programs.

Demographic Profile

Demographic profiles are provided in Tables 1 to 3. Section one of the Trew Mental Training and Injury Rehabilitation Questionnaire asked athletes to respond to several questions in order to obtain demographic information. A total of two hundred and ninety respondents ($N=390$) returned completed questionnaires, one hundred and fifty four ($n=154$, 53.1%) were male and one hundred thirty six ($n=136$, 46.9%) were female. The highest percentage of respondents were twenty one years of age (21.4%) and currently competing in their first year of eligibility (39%) as AUS athletes. Respondents competed in the following five sports: mens and womens basketball ($n=102$, 35.2%), mens and womens volleyball ($n=108$, 37.2%), mens hockey ($n=52$, 17.9%), mens and womens wrestling ($n=22$, 7.6%) and mens and womens swimming ($n=6$, 2.1%).

Table 1: Gender, Number and Total Percentage by Age of Respondents

Sport	Age																	
	18		19		20		21		22		23		24		25+			
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Basketball	9	12	18	3	7	13	9	11	5	7	3	2	2	0	4	0		
Volleyball	5	12	7	21	5	28	6	31	5	6	1	1	3	2	3	1		
Hockey	0	-	0	-	0	-	22	-	11	-	7	-	8	-	4	-		
Wrestling	2	3	3	2	3	6	1	0	1	1	0	2	3	0	2	0		
Swimming	2	0	1	2	1	6	0	0	0	0	0	0	0	0	0	0		
Total N	18	29	25	50	18	33	40	21	28	14	11	5	16	2	12	1		
Total %	16.2%	25.2%	17.6%	31.6%	16.9%	28.4%	21.4%	11.7%	23.9%	11.7%	9.2%	4.2%	14.2%	1.7%	10.3%	0.9%		

*Bolted numbers indicate the highest response rate.

Table 2: Gender, Number and Total Percentage of Year of Eligibility of Respondents

Sport	Year of Eligibility									
	1		2		3		4		5	
	M	F	M	F	M	F	M	F	M	F
Basketball	23	17	5	11	10	9	5	11	6	5
Volleyball	10	27	9	22	7	14	5	8	3	3
Hockey	22	-	18	-	12	-	7	-	6	-
Wrestling	5	4	6	1	2	0	1	1	0	0
Swimming	3	1	0	1	0	1	0	0	1	1
Total N	54	49	30	35	31	24	18	20	10	9
Total %	39%	34.8%	22.4%	26.3%	19%	15.4%	13%	14.6%	7.4%	6.6%

*Bolted numbers indicate the highest response rate.

Table 3: Number and Percentage of Respondents by Gender and Sport

Sport	M (n=154)		F (n=136)		Overall (N=290)	
	N	%	N	%	N	%
Basketball	49	32%	83	62%	132	46.2%
Volleyball	34	21.1%	74	58.9%	108	37.1%
Hockey	52	100%	-	-	52	18.8%
Wrestling	19	12.3%	7	5.2%	26	9.6%
Swimming	4	2.6%	2	1.5%	6	2.1%

*Bulleted numbers indicate the highest response rate.

Access

Slightly more than half (n=153, 52.8%) of AUS athletes reported having access to a sport psychologist or mental training consultant (See Table 4). Volleyball players had the greatest access overall (n=77, 71.3%), while hockey players reported having the least access (n=11, 21.2%). Access to a sport psychologist or mental training consultant may depend on whether the athletes respective university employs a professor specializing in sport psychology, whether the university is situated in a demographic region where a sport psychologist is available, whether the university team has the means to employ a sport psychologist or whether the coaching staff feels that a sport psychologist may be of benefit to their program. It is also possible that some athletes may not be aware of the services that are available to them, as the majority of participants in this study were in their first year of eligibility.

Table 4: Gender, Number, Percentage and Overall Mean Scores of Respondents to Sport Psychologists or Mental Training Consultants

Sport	Male (n=124)				Female (n=136)				Overall Mean Scores	
	Assess		No Assess		Assess		No Assess		N	%
	N	%	N	%	N	%	N	%		
Basketball	27	33.3%	12	44.9%	34	45.3%	26	34.7%	31	50%
Volleyball	29	85.3%	5	14.7%	48	64.9%	26	35.1%	77	71.3%
Hockey	11	21.2%	48	78.8%	-	-	-	-	11	21.2%
Wrestling	7	46.7%	8	33.3%	1	14.3%	6	85.7%	8	36.4
Swimming	4	66.7%	-	-	2	33.3%	-	-	6	100%
Overall Totals	78	36.6%	78	49.4%	75	55.1%	61	44.9%	133	52.8%

*Bolded numbers indicate the highest response rate.

Knowledge of Mental Skills

Goal Setting

When respondents were asked to indicate of which mental skills they had knowledge, 95.5% of athletes (n=277) indicated that they had knowledge of goal setting. Table 5 provides the results of athletes' knowledge about mental skills. Several factors may contribute to this high rate of knowledge. Goal setting has been referred to as a life skill that in addition to sport, has been used in a variety of disciplines including business and health care, thus giving goal setting a common and conventional reputation. Secondly, because of the conventional nature of goal setting, most people do not directly associate this skill with the field of psychology. Finally, goal setting seems to be a relatively straight forward skill to use as it requires little background knowledge and allows for a great deal of flexibility to accommodate athlete's varying needs.

Table 3: Gender, Number and Total Percentage of Respondents/
Knowledge of Individual Mental Skills

Mental Skills	Male		Female		Total % Knowledge
	Knowledge	No Knowledge	Knowledge	No Knowledge	
Goal Setting	145	9	130	6	88.8%
Positive Self-Talk	119	25	105	23	76.8%
Imagery	123	31	121	15	84.1%
Visualization	87	27	90	46	64.3%
Relaxation Techniques	47	107	42	98	30.7%
Arousal Regulation	111	40	106	50	54.8%
Concentration Focus	-	-	-	-	-
Does Not Have Any Knowledge of Mental Skills	-	-	-	-	-
Other	2	-	1	-	1%

*Bolted numbers indicate the highest response rate.

Imagery/Visualization

A large number of respondents ($n=244$, 84.1%) indicated that they had knowledge of imagery and visualization. This finding suggests that athletes, at some point have been educated about some of the mental skills considered less conventional in nature. Iversen and Orlick (1991) suggest that there may be an indirect link between goal setting and imagery as goal setting involves a form of imagery. The process of setting a goal is a statement of expectation, thus a conceptualization of success is also likely to occur. Once a goal is set, a person will periodically contemplate achieving that goal. This may create an image of those activities one can engage in that are consistent with achieving the goal. The latter could account for the high rates of awareness in both goal setting and imagery. Conversely, imagery and visualization are skills that unlike goal setting require a certain degree of background knowledge and practice in order to be able to execute the skills with a level of

proficiency and precision. This finding further supports the notion that the athletes of this study have received important information to enable them to use imagery and visualization.

Positive Self-Talk, Concentration/Focus and Relaxation Techniques

The results of positive self-talk, concentration/focus and relaxation techniques are reported and discussed together as the findings are similar. Two hundred and twenty-two respondents (75.6%) indicated they had knowledge of positive self-talk. Two hundred and seventeen respondents (74.8%) indicated they had knowledge of concentration and focus and one hundred and eighty-seven respondents (64.5%) indicated they had knowledge of relaxation techniques. As these terms seem self-explanatory by title, one could hypothesize that even more athletes should have indicated they had knowledge of these mental skills. It may be assumed that athletes consider remaining positive, maintaining concentration and focus and using various techniques to control anxiety and stress as important requirements to achieve success in their sport. It is possible that respondents in this study use these techniques during some practices and competitions and are not cognizant of their use, as these skills may be automatic and inherent.

Arousal Control

Only 30.3% (n=89) of respondents indicated they had knowledge of arousal control. This is an interesting finding, as the ability to adjust one's level of arousal to achieve optimal performance is a skill that coaches often emphasize and many athletes strive to attain. Athletes may be unfamiliar with the term "arousal control". They may be more familiar with terms such as "psyching up" or "getting in the zone". Also, athletes may not be fully conscious of what they do to in attempts to obtain optimal levels of arousal. The ability to control feelings of anxiety when nervous or the ability to produce energy when lethargic, are actually methods of controlling levels of arousal. The name of arousal control may be an

inherent and automatic aspect of elite athletes's performances and thus athletes may not consider this to be an actual skill.

Use of Mental Skills

Respondents were asked to indicate how often they used mental skills as part of their training regimen (See Table 6). Eighty-three (28.6%) respondents reported using mental skills training three or more times per week. One hundred and sixteen respondents (46%) reported using mental skills training one or two times per week and forty-two (14.5%) respondents indicated using mental skills training once per month. Combined, these results indicate that 83.1% of respondents (n=241) use mental skills training. These findings should be considered carefully. One hundred and fifty-eight respondents (54.5%) reported that they use mental skills training one or two times per week or once per month, suggesting that respondents are not using mental skills training as part of their daily training regimen, as training sessions or practices at the AUS level are likely to be held at least four times per week. Several factors may contribute to this finding. The coaching staff may not encourage the use of mental skills, thus athletes do not make practice of mental skills a priority in their training regimens. The busy schedules of student athletes may limit the amount of time that they are able to commit to mental skills training. Further, the financial constraints of university athletic programs may limit the amount of access athletes have to qualified professionals and universities who do employ qualified professionals may not have enough resources to accommodate all student athletes. It is encouraging to note that only 13.5% (n=39) of athletes reported not using mental skills training at all, suggesting that AUS athletes for the most part are taking advantage of the benefits that mental skills training can offer.

Table 6: Gender, Number, Percentage and Total Percentage of How Often Respondents Use Mental Skills

How Often	Male (n=154)		Female (n=136)		Total	
	N	%	N	%	N	%
1-2 Times Per Week	82	53.7%	64	47%	146	49%
3 or More Times Per Week	36	22.3%	33	24.3%	69	23.6%
Once Per Month	23	14.9%	19	14%	42	14.3%
Not At All	22	14.2%	17	12.3%	39	13.2%
Other	7	4.6%	3	2.2%	10	3.2%

*Bolted numbers indicate the highest response rate.

Age of Respondents

Respondents were asked to indicate the age at which they were first introduced to mental skills training. Approximately half of the respondents (n= 144, 49.7%) indicated that they were introduced to mental skills training at 10-12 years of age, while 45.5 % (n=132) of respondents were introduced to mental skills training at nine years of age or under. It is interesting to note that no respondents indicated they were introduced to mental skills training between the ages of thirteen and their present age. Further, only 4.8% of respondents (n=14) indicated that they had never been introduced to mental skills training. These results suggest that youth athletic programs are aware of the value of mental skills training and are incorporating them at an early age into their respective programs. The early introduction of mental skills training may help athletes develop an open and positive attitude about the use of mental skills in sport, and allow them to realize the importance of engaging multiple components of training (physical, mental, technical and tactical). Table 7 summarizes the data on the age of introduction to mental skills training.

Table 7: Gender, Number and Percentage of Respondents
Age When Introduced to Mental Skills Training

Age Introduced to Mental Skills Training	Male (n=134)		Female (n=134)		Overall (N=268)	
	N	%	N	%	n	%
9 Years or Under	67	49.3%	65	47.8%	132	49.3%
10-12 Years	68	51.6%	53	40.1%	121	46.0%
13-15 Years	-	-	-	-	-	-
16-18 Years	-	-	-	-	-	-
19 + Years	-	-	-	-	-	-
Never Introduced	6	3.9%	8	3.8%	14	4.8%

*Bolded numbers indicate the highest response rate.

Previous Injury

When athletes were asked if they had ever sustained an injury causing them to miss one or more weeks of training or competition, 84.4% (n=130) of males and 71.3% (n=97) of females indicated they had been previously injured. Most male hockey players (n=48, 92.3%) had sustained injuries. This is not a surprising finding considering the high level of physical contact and aggressive nature of the sport. All female swimmers (n=2, 100%) and 85.7% (n=7) of female wrestlers sustained injuries. It should be noted that these categories had few participants and the related results should be considered carefully. Overall, 28.7% (n=39) of female athletes indicated they had never sustained an injury causing them to miss one or more weeks of training or competition compared to 15.6% (n=24) of males. The lower number of female athletes who had not sustained an injury may be attributed to the fact that there were no female ice hockey players in this study and one may assume that the injury rate for a contact sport would have yielded a higher occurrence. It is also interesting to note that only 73.3% (n=11) of male wrestlers reported sustaining an injury. Similar to hockey, wrestling is a high contact sport, also aggressive in nature. It can be surmised that the injury rate among wrestlers would be similar to hockey players, however wrestlers train on mats,

which have considerably more give compared to ice surfaces and this may account for their lower injury rate. Table 8 on the following page provides information on injury among respondents by sport.

Previous Injury and Mental Skills Training

Of the athletes who indicated they had sustained an injury causing them to miss one or more weeks of training or competition, 24.1% ($n=37$) of males and 17.6% ($n=24$) of females indicated that they used mental skills in their injury rehabilitation programs (See Table 9). These results may suggest that the majority of athletes are not receiving the encouragement, guidance or skills necessary to help them incorporate mental skills training in their injury rehabilitation programs. These findings may be attributed to the fact that the use of mental skills training in injury rehabilitation is a fairly new concept, thus coaches, athletic trainers and athletes may not be aware, educated or feel comfortable implementing mental skills training in injury rehabilitation programs. Research conducted by Wiese et. al. (1991) revealed that athletic trainers believed in using psychological skills and strategies in injury rehabilitation, but that trainers would require further education by qualified sport psychology professionals in order to feel confident incorporating these skills. Similar findings were reported in research conducted by Larson et. al. (1996). Athletic trainers cited lack of knowledge of psychological strategies, and limited or no access to sport psychologists as reasons for not incorporating mental skills training into injury rehabilitation programs.

Table 8: Gender, Number, Percentage and Total Percentage of Injury Among Respondents By Sport

Sport	Male				Female			
	Previous Injury		No Injury		Previous Injury		No Injury	
	N	%	N	%	N	%	N	%
Basketball	19	79.6%	11	20.4%	40	73.5%	13	24.5%
Volleyball	29	85.3%	5	14.7%	49	66.2%	24	31.8%
Hockey	48	92.9%	4	7.7%	-	-	-	-
Wrestling	11	73.3%	4	26.7%	6	85.7%	1	14.3%
Swimming	3	75%	1	25%	2	100%	0	0
Total	130	84.4%	34	15.6%	97	71.3%	39	28.7%

*Bolted numbers indicate the highest response rate.

Table 9: Sport, Gender, Number and Percentage of Respondents Who Used Mental Skills Training During Injury Rehabilitation

Sport	Male						Female					
	Yes		No		N/A		Yes		No		N/A	
	N	%	N	%	N	%	N	%	N	%	N	%
Basketball	7	14.3%	30	61.2%	12	24.5%	11	20.8%	31	58.3%	11	20.9%
Volleyball	9	26.5%	21	61.8%	4	11.7%	11	14.9%	38	51.3%	25	33.8%
Hockey	16	33.3%	32	66.7%	4	8.3%	-	-	-	-	-	-
Wrestling	4	26.7%	7	46.7%	4	26.6%	1	14.3%	6	85.7%	-	-
Swimming	1	25%	2	50%	1	25%	1	50%	1	50%	-	-
Overall Total	37	24.1%	91	58.9%	25	16.2%	24	17.6%	76	55.9%	36	26.5%

*Bolted numbers indicate the highest response rate.

Mental Skills Practices

Section two of the Trew Mental Skills Training and Injury Rehabilitation

Questionnaire asked participants to respond to questions about mental skills training using a seven-point Likert-Scale. A value of one indicated "strongly disagree", two indicated "disagree", three indicated "disagree somewhat", four indicated "neutral", five indicated "agree somewhat", six indicated "agree" and seven indicated "strongly agree". Tables 10 to 13 summarize the athletes responses on the use of mental skills.

Question one asked participants if they believed that mental skills training enhanced their athletic performance. The overall mean response to this question was 5.58. One

hundred and seventy-eight respondents (61.4%) indicated that they either "agreed" or "strongly agreed" that mental skills training enhanced athletic performance. There was a very slight difference noted between the responses of male and female respondents. Slightly more male respondents ($n=97$), 63%, indicated they either "agreed" or "strongly agreed" that mental skills training enhanced athletic performance compared to 59.6% ($n=75$) of female respondents who either "agreed" or "strongly agreed". These results seem to suggest that many AUS athletes do in fact value the use of mental skills to enhance performance and thus may be more inclined to support the use of mental skills training in injury rehabilitation.

The second question asked respondents if they believed that AUS athletes would be affected psychologically by injury. The overall mean response to this question was 5.46. One hundred and fifty-eight respondents (54.5%) indicated that they either "agreed" or "strongly agreed" that AUS athletes are affected psychologically by injury. A larger number of female respondents ($n=83$), 61.1%, indicated that they either "agreed" or "strongly agreed" with this statement, compared to 48.7% ($n=75$) of male respondents who either "agreed" or "strongly agreed". These findings may suggest that respondents believe that injury is multidimensional in nature, thus supporting the notion that caring for injured athletes in a holistic manner, addressing both the mind and body may contribute to a faster and more prepared return to activity.

The next question asked athletes to indicate whether they believed their coaches would encourage them to use mental skills training to assist their injury rehabilitation programs. The overall mean response was 4.91. One hundred and nineteen respondents (41%) indicated that they either "agreed" or "strongly agreed" that their coaches would encourage them to use mental skills training to assist in their injury rehabilitation programs. A larger number of female respondents ($n=64$), 47.1% indicated that they either "agreed" or

Table 10: Means and Standard Deviations For Responses About Mental Skills Practices

I believe that ...	Male (n=154, 51.17%)		Female (n=136, 44.99%)		Overall (N=290)	
	M	SD	M	SD	M	SD
using mental skills enhances performance	5.88	1.404	5.37	1.263	5.58	1.337
athletes are affected psychologically	5.52	1.380	5.63	1.276	5.48	1.329
Coaches support use of mental skills	4.71	1.624	5.14	1.413	4.91	1.542
Caregiver supports use of mental skills	4.67	1.553	4.88	1.377	4.77	1.474
team-mates support use of mental skills	4.06	1.526	4.52	1.444	4.18	1.487
Length of rehab & use of mental skills	4.88	1.499	5.18	1.315	4.99	1.413
Use of mental skills in future rehab	5.35	1.430	5.68	1.215	5.51	1.342

*Italicized numbers indicate the highest response rate.

"strongly agreed" with this statement, compared to 35.8% (n=55) of male respondents. An explanation for the difference in responses between male and female respondents may be found in previous research findings. Crossman (1997) reported that injury among male athletes might be interpreted as a sign of weakness by the athletes themselves or by team-mates and coaches. It is possible that some male athletes feel as though their coaches would view the implementation of mental skills training in injury rehabilitation programs as unnecessary or as a sign of weakness. A Chi-squared test was used to determine if a significant discrepancy existed between athletes' beliefs that mental skills training enhances athletic performance and athletes' beliefs that their coaches would encourage the use of mental skills training in injury rehabilitation. The results confirm a significant difference in

the responses ($\chi^2=100.4$; $p<0.001$). It might be expected that athletes hold their coaches' opinions and views in high stead because their success may be dependent on their relationship with their coaches. If a coach communicated a favourable attitude about using mental skills training in injury rehabilitation, it is unlikely that an athlete would jeopardise this relationship by going against their coach's wishes. However, a histogram (Appendix F) illustrates the differences in the responses between athletes' beliefs about mental skills training enhancing athletic performance and athletes' beliefs that their coaches would encourage the use of mental skills training in future injury rehabilitation. It seems that athletes place more importance on mental skills training to enhance athletic performance than they perceive their coaches would on the use of mental skills training in injury rehabilitation, hence the larger frequencies of positive numbers in the histogram. Since coaches are generally not the primary caregivers of injured athletes, they do not deal with athletes in the context of injury rehabilitation.

Seventy-five respondents (25.9%) indicated that they were "neutral", while 72 (24.8%) respondents indicated that they "agreed somewhat" that their caregivers would encourage the use of mental skills training to assist in their injury rehabilitation programs. The overall mean response was 4.77. Both male and female respondents (n , $n=49$, 36%; f , $n=49$, 31.9%) indicated that they either "agreed" or "strongly agreed" that their caregivers would encourage the use of mental skills training to assist in their injury rehabilitation programs. These findings are consistent with previous studies (Wiese et al., 1994 and Larson et al., 1996). These studies suggested that athletic trainers felt that mental skills training would be of benefit to injured athletes, however a lack of education, time and access to qualified sport psychology professionals limited their ability to implement mental skills

training in their injury rehabilitation programs in an effective manner. The results of a Chi-squared test confirm a perceived difference in responses ($\chi^2=118.3$; $p=0.001$) between athletes' beliefs about mental skills training enhancing athletic performance and athletes' beliefs that their caregivers would encourage the use of mental skills training in injury rehabilitation. A histogram (Appendix G) illustrates the differences in the responses between athletes' beliefs about mental skills training enhancing athletic performance and athletes' beliefs that their caregivers would encourage the use of mental skills training in future injury rehabilitation.

Respondents were also asked if they felt that their team-mates would encourage the use of mental skills training to assist in their injury rehabilitation programs. The overall mean response was 4.18. Most respondents ($n=97$), 33.4% indicated that they were "neutral" with regards to their team-mates encouraging the use of mental skills training to assist in their injury rehabilitation programs, with male and female respondents (m , $n=49$, 31.9%; f , $n=48$, 35.3%) responding similarly. This is not a surprising finding, as athletes admitting or allowing their peers to witness what may be considered vulnerability may be wrongly interpreted as a sign of weakness and cause the athlete undeserved and unwanted grief. Also, taking into consideration that less than one quarter of the participants ($n=61$), 21%, indicated that they had used mental skills training during their injury rehabilitation, one might expect that it may take some time before athletes feel comfortable accepting the implementation of mental skills training in injury rehabilitation as a routine practice. The results of a Chi-squared test indicate that the relationship between athletes' beliefs that mental skills training enhances athletic performance and athletes' beliefs that their team-mates would encourage the use of

mental skills training in injury rehabilitation are significant ($\chi^2=124.5$; $p<0.001$). A histogram (Appendix H) illustrates that athletes place more importance on the use of mental skills training to enhance athletic performance than they would perceive their team-mates to place on encouraging them to use mental skills training in injury rehabilitation.

A dearth exists in research that has examined the relationship between athletes who believe that mental skills training enhances athletic performance and athletes who believe that their coaches, caregivers and team-mates would support the use of mental skills training in injury rehabilitation. However, it is often acknowledged that athletes generally value their coaches' opinions and as a result may be more inclined to share these views or comply with their coach's methods. This may also be true of athlete's relationships with their caregivers. Athletes may place a great deal of trust in these individuals as they depend on them to aid in their return to competition. If caregivers value and make use of mental skills training in their injury rehabilitation programs, it is likely that their athletes would be influenced to value the role of mental skills training. As a result of both coaches and caregivers supporting the use of mental skills training, it may increase the likelihood that team-mates, regardless of their injury experiences would also adopt these views.

Based on these findings, it may be suggested that coaches and caregivers work cooperatively in order to communicate similar views to their athletes. Cornelius (2002) reported that the social network of injured athletes is an important component of both physical and emotional recovery. The social network can facilitate recovery by providing understanding and encouragement, or inhibit recovery by being overprotective or placing too much pressure on the athlete to return to competition before they are prepared. By creating

positive working relationships among coaches and caregivers, athletes may be better equipped to cope when confronted with stressful situations such as injury, as they will be familiar with the valued components of their environment.

Athletes were also asked whether they believed that the length of their injury rehabilitation would affect the likelihood that they use mental skills training. The overall mean response was 4.99. One hundred and twenty-three respondents (42.4%) either "agreed" or "strongly agreed" with this statement, 48.6% ($n=66$) were female respondents and 37.1% ($n=57$) were male. These results were somewhat surprising, as it may be assumed that athletes who were out of commission for longer periods of time would value using mental skills training to keep them motivated and focused on their injury rehabilitation programs. These results may suggest that perhaps the majority of respondents in this study have not been injured for long periods of time, have not had the benefit of having mental skills training incorporated in their injury rehabilitation programs, or that they simply feel that mental skills are helpful regardless of the length of the injury rehabilitation.

The final question in this section asked respondents if they would be willing to use mental skills training in future injury rehabilitation programs. The overall mean response was 5.51. The results indicated that over half of the participants ($n=179$, 61.8%) either "agreed" or "strongly agreed" that they would use mental skills training in their future injury rehabilitation programs. Both male and female respondents (m , $n=87$, 56.5%; f , $n=92$, 67.6%) responded similarly. These results seem to indicate that AUS athletes are willing to use mental skills training in future injury rehabilitation.

Table 11: Overall Number and Percentage of Respondent's Beliefs About Mental Skills Practices

I believe that...	Grand (N=100)													
	1		2		3		4		5		6		7	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Using mental skills enhances performance	1	1.0%	7	7.0%	8	8.0%	10	10.0%	62	62.0%	101	101.0%	77	77.0%
Athletes are affected psychologically	1	1%	11	11.0%	1	1%	41	41.0%	73	73.0%	87	87.0%	71	71.0%
Coach supports use of mental skills	4	4.0%	22	22.0%	17	17.0%	67	67.0%	78	78.0%	72	72.0%	67	67.0%
Caregiver supports use of mental skills	5	5.0%	17	17.0%	18	18.0%	78	78.0%	72	72.0%	61	61.0%	58	58.0%
Team-mates support use of mental skills	18	18.0%	29	29.0%	30	30.0%	87	87.0%	61	61.0%	61	61.0%	18	18.0%
Length of rehab & use of mental skills	8	8.0%	12	12.0%	18	18.0%	93	93.0%	76	76.0%	92	92.0%	31	31.0%
Use of mental skills in future rehab	10	10.0%	2	2%	3	3%	38	38.0%	68	68.0%	120	120.0%	57	57.0%

*Bulleted numbers indicate the highest response rate.

Table 12: Number and Percentage of Male Respondent's Beliefs About Mental Skills Practices.

I believe that...	Male (n=74)													
	1		2		3		4		5		6		7	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Using mental skills enhances performance	2	2.7%	6	8.1%	5	6.8%	16	21.6%	28	37.9%	52	70.3%	48	64.8%
Athletes are affected psychologically	1	1%	7	9.5%	2	2.7%	29	39.1%	47	63.5%	44	59.5%	34	46.1%
Coach supports use of mental skills	3	4.1%	14	18.9%	16	21.6%	37	50.0%	52	70.3%	52	70.3%	23	31.1%
Caregiver supports use of mental skills	3	4.1%	9	12.2%	12	16.2%	37	50.0%	48	64.8%	34	46.1%	19	25.7%
Team-mates support use of mental skills	8	10.8%	18	24.3%	23	31.1%	49	66.2%	29	39.1%	17	23.0%	10	13.5%
Length of rehab & use of mental skills	7	9.5%	6	8.1%	9	12.2%	29	39.1%	46	62.2%	37	50.0%	18	24.3%
Use of mental skills in future rehab	7	9.5%	3	4%	2	2.7%	16	21.6%	34	46.1%	62	83.8%	25	33.8%

*Bulleted numbers indicate the highest response rate.

Table 13: Number and Percentage of Female Respondent's Beliefs About Mental Skills Practices

I believe that ...	Female (n=156)													
	1		2		3		4		5		6		7	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Using mental skills enhances performance	3	1.9%	1	.7%	3	1.9%	14	8.9%	34	21%	49	30.7%	32	20.5%
Athletes are affected psychologically	-	-	1	.7%	1	.7%	11	6.9%	34	21.1%	43	27.4%	40	25.5%
Coach supports use of mental skills	1	.7%	1	.7%	7	4.4%	10	6.3%	17	10.9%	40	25.5%	24	15.4%
Coaches support use of mental skills	3	1.9%	8	5.0%	9	5.7%	10	6.3%	31	19.7%	34	21.6%	13	8.1%
Team-mates support use of mental skills	8	5.0%	11	6.9%	7	4.4%	48	30.6%	31	19.6%	24	15.1%	4	2.5%
Length of rehab & use of mental skills	1	.7%	4	2.4%	9	5.6%	14	8.8%	34	21.6%	33	19%	13	8.2%
Use of mental skills in future rehab	4	2.5%	-	-	-	-	14	8.8%	34	21.6%	41	25.9%	31	19.7%

*Bolded numbers indicate the highest response rate

Projected Use of Mental Skills in Future Injury Rehabilitation

Respondents were asked which mental skills they would use in future injury rehabilitation. A large number of male respondents, 77.3% (n=118) indicated that they would be most likely to use goal setting in future injury rehabilitation, while 82.4% (n=112) of female respondents indicated that they would be most likely to use positive self-talk. The results related to goal setting are not surprising, as previously mentioned data indicated that 95.5% of respondents had knowledge of goal setting. The results from female respondents indicating they would be most likely to use positive self-talk in future injury rehabilitation are somewhat surprising, considering that more female athletes overall (78.6%) had knowledge of imagery and visualization than positive self-talk. However, if one considers the past experiences of injured female athletes, they may feel that positive self-talk may be of greater

value to them. Perhaps the notion that a positive mindset may carry one through a difficult time has become a realization of previously injured female athletes. Table 14 provides data on the projected use of mental skills training in future injury rehabilitation.

Table 14. Frequency, Percentage and Mean Average of the Projected Use of Mental Skills Training in Future Injury Rehabilitation

Mental Skills	Male				Female				Mean % Future Use
	Future Use		No Future Use		Future Use		No Future Use		
	N	%	N	%	N	%	N	%	
Goal Setting	119	71.3%	55	22.7%	107	76.7%	29	21.3%	78%
Positive Self-Talk	100	67.3%	50	32.3%	112	82.4%	24	17.6%	75%
Imagery Visualization	79	31.3%	75	48.7%	74	54.4%	62	45.6%	52.9%
Relaxation Techniques	76	49.4%	78	50.6%	78	57.4%	58	42.6%	55.4%
Arousal Regulation	23	16.2%	129	83.8%	23	16.9%	113	83.1%	16.6%
Concentration Focus	94	61%	60	39%	84	61.3%	52	38.7%	61.6%

*Bolded numbers indicate the highest response rate.

Coping With An Injury

The final question asked athletes to rank the five most difficult aspects of coping with an injury during rehabilitation. Two primary factors were clearly identified. The third aspect of coping with an injury was split among three factors and the fourth and fifth choices were further subdivided. The results are summarized according to respondents' first, second and third choices (see Tables 15 to 17).

The Most Difficult Aspect of Coping With an Injury

Two hundred and fifteen respondents (74%) indicated that the frustration of not being able to play was the most difficult aspect of coping with an injury during rehabilitation. This finding was similar among the athletes in most of the sports in this study (basketball, volleyball, hockey, wrestling and swimming, see table 15). A difference was noted between male and female swimmers but should be considered in respect to the small sample size (m, n=4; f, n=2). The findings about frustration and coping with injury are understandable as these elite athletes devote a great amount of time and considerable effort to their respective sports. To alter one's schedule from being extremely busy and structured as a student athlete, to suddenly having free time and being distanced from team-mates may leave athletes feeling helpless and frustrated about their inability to pursue their usual routines. Further, student athletes are often identified through their association with their respective sports. When an athlete sustains an injury that keeps them from competing, they may feel as though they have been "robbed" of their identity, thus further contributing to their feelings of frustration. The findings are consistent with previous research that indicated that frustration, depression and anger were among the three primary emotions exhibited by athletes following an injury (Crossman, 1997).

Table 13: Gender, Sport, Number and Percentage of the First Most Difficult Aspect of Coping With Injury During Rehabilitation

Variables	Basketball				Volleyball				Hockey	
	Male		Female		Male		Female		Male	
	N	%	N	%	N	%	N	%	N	%
Decreased Socialization	4	8.2%	2	3.8%	2	3.9%	7	9.2%	6	11.3%
Frustration	39	77.4%	48	81%	28	76.9%	54	79%	34	69.3%
Anxiety	3	6.1%	3	5.7%	3	8.4%	6	8.1%	3	5.8%
Decreased Communication	3	6.1%	1	1.7%	2	5.3%	1	1.3%	1	1.9%
Fear of Replacement	3	6.1%	2	3.8%	1	2.6%	4	5.4%	3	5.8%
Adherence to Rehab Program	1	2.1%	-	-	-	-	2	2.7%	1	1.9%
Total	49	100%	53	100%	34	100%	74	100%	52	100%

*Bolded numbers indicate the highest response rate

Table 13 - Continued

Variables	Wrestling				Swimming			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
Decreased Socialization	1	6.7%	1	14.3%	-	-	-	-
Frustration	11	71.2%	6	85.7%	2	69%	2	100%
Anxiety	1	6.7%	-	-	1	33%	-	-
Decreased Communication	1	6.7%	-	-	-	-	-	-
Fear of Replacement	1	6.7%	-	-	-	-	-	-
Adherence to Rehab Program	-	-	-	-	1	33%	-	-
Total	15	100%	7	100%	4	100%	2	100%

*Bolded numbers indicate the highest response rate.

The Second Most Difficult Aspect of Coping With an Injury

One hundred and thirty-nine (48%) respondents indicated that the anxiety about recovery time was the second most difficult aspect of coping with an injury during rehabilitation. Some differences existed between sports (basketball, volleyball, hockey, wrestling and swimming, see table 16).

In most situations, the goal of an injured athlete would be to fully rehabilitate as quickly as possible and return to competition. However, the more valuable the athletes consider themselves to be to their teams, the more anxiety the athlete will likely experience. When a valued athlete sustains an injury, the athlete and athletic trainer may feel pressure from the coaching staff to treat the injury as quickly as possible so the athlete can return to competition. Feelings of anxiety may also be generated because the athlete feels unprepared to return to competition. The athlete is concerned about sustaining further injury, or the athlete fears that they will be unable to perform to the level they did before they were injured.

A number of other situations may cause athletes to feel anxious about recovery time. An injury that occurs towards the end of the season when playoffs or finals are nearing may create greater feelings of anxiousness, as athletes may work all season to be part of the excitement and prestige of success. Also, athletes who are being scouted for future endeavours may be devastated by injury, as future opportunities may be jeopardized. These findings as a whole are consistent with those findings reported by Larson et. al. (1996), in their survey of athletic trainers, who reported that stress and anxiety were visible in athletes following an injury.

Table 14. Gender, Sport, Number and Percentage of the Second Most Difficult Aspect of Coping With Injury During Rehabilitation

Variables	Basketball				Volleyball				Hockey	
	Male		Female		Male		Female		Male	
	N	%	N	%	N	%	N	%	N	%
Decreased Socialization	5	16.2%	3	9.7%	8	25.9%	5	6.8%	14	26.9%
Frustration	6	12.2%	6	11.8%	2	5.9%	11	14.8%	12	25.1%
Anxiety	14	49%	23	65.2%	12	36.3%	36	48.7%	15	28.9%
Decreased Communication	3	6.1%	1	1.8%	2	5.9%	4	5.4%	-	-
Fear of Replacement	9	18.4%	3	15.2%	6	17.6%	17	23%	9	17.3%
Adherence to Rehab Program	2	4.1%	3	5.7%	4	11.8%	1	1.2%	2	3.8%
Total	49	100%	53	100%	34	100%	74	100%	52	100%

*Bolted numbers indicate the highest response rate.

Table 14 - Continued

Variables	Wrestling				Swimming			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
Decreased Socialization	1	6.7%	1	14.3%	1	25%	-	-
Frustration	1	6.7%	-	-	1	25%	-	-
Anxiety	18	66.7%	6	85.7%	2	50%	1	50%
Decreased Communication	1	6.7%	-	-	-	-	-	-
Fear of Replacement	1	6.7%	-	-	-	-	1	50%
Adherence to Rehab Program	-	-	-	-	-	-	-	-
Other	1	6.7%	-	-	-	-	-	-
Total	15	100%	7	100%	4	100%	2	100%

*Bolted numbers indicate the highest response rate.

The Third Most Difficult Aspect of Coping With an Injury

Several responses were identified as the third most difficult aspect of coping with an injury during rehabilitation. These responses included 47.4% (n=89) of respondents reporting adhering to the rehabilitation program, 39.3% (n=82) reporting the fear of being replaced and 28.2% (n=59) reporting decreased socialization with the team. (See Table 17). Some similarities between teams were noted among the responses. Both male volleyball players (n=11, 32.4%) and male wrestlers (n=4, 28.6%) indicated that adhering to the rehabilitation program was among the third most difficult aspect of coping with an injury during rehabilitation. Female basketball players (n=13, 34.5%), female volleyball players (n=28, 37.8%), hockey players (n=18, 34.7%) and female wrestlers (n=3, 28.6%) responded that the fear of being replaced was their third most difficult aspect of coping with an injury. Male basketball players (n=11, 22.4%) and female basketball players (n=13, 34.5%) shared the perspective that anxiety about recovery time was the third most difficult aspect of coping. Following is a brief discussion about adhering to the rehabilitation program, the fear of being replaced and decreased socialization with the team.

Adhering to the rehabilitation program was reported by 47.4% (n=89) of respondents as the third most difficult aspects of coping with an injury during rehabilitation. Perhaps those athletes who have long rehabilitation programs ahead of them find it difficult to adhere as they near the end of their programs. This may be attributed to a loss of interest as they feel their injuries have adequately healed or they have become bored with a monotonous program. This may lead to reinjury and as a result more rehabilitation.

The fear of being replaced was reported by 39.3% (n=82) as the third most difficult aspects of coping with an injury during rehabilitation. It is often the case that when a valued player becomes injured, an opportunity for a less experienced or less talented player arises.

When given the opportunity to prove themselves, the new player may display ability and talent that was previously unrealized. The injured player may experience mixed emotions with this occurrence. Athletes may be relieved that someone is able to fill their shoes and keep the team competitive, however at the same time, they may feel threatened that their once valued role on the team will no longer exist in the same capacity.

Decreased socialization with the team was identified by only 28.2% (n=59) of the athletes as a difficult aspect of coping with an injury during rehabilitation. This finding may indicate that athletes who have been injured in the past have not felt removed from their teams, as perhaps strong support systems have been in place to ensure they remained a part of the team environment. In some situations, an injury may provide an athlete with a sense of relief. The pressure to perform flawlessly may be alleviated and the athlete may have much needed time away from their team to concentrate on other areas they feel they have been neglecting, thus socialization would not be an issue.

The Role of Mental Skills Training in Injury Rehabilitation

In order to gain a better understanding of respondent's feelings concerning the role of mental skills training in injury rehabilitation, an open-ended question was developed to allow respondents the opportunity to express their opinions. The results from the short answer open-ended question will be presented and discussed in the following section.

The question asked respondents: "Do you think that mental skills have a role in injury rehabilitation? Why or why not?" Each response was reviewed and themes were identified and recorded.

Table 12: Gender, Sport, Number and Percentages of the Third Most Difficult Aspect of Coping With Injury During Rehabilitation

Variables	Basketball				Volleyball				Hockey	
	Male		Female		Male		Female		Male	
	N	%	N	%	N	%	N	%	N	%
Decreased Socialization	11	21.4%	10	18.9%	1	2.9%	20	27%	10	19.2%
Frustration	3	6.1%	-	-	3	8.8%	2	2.7%	1	1.9%
Anxiety	11	21.4%	13	24.5%	5	14.3%	13	20.3%	10	18.8%
Decreased Communication	7	14.3%	5	9.4%	5	14.3%	3	4.1%	6	11.5%
Fear of Replacement	8	16.1%	13	24.5%	9	26.7%	20	31.8%	10	19.2%
Adherence to Rehab Program	9	18.5%	12	22.7%	10	32.4%	6	8.1%	1	1.9%
Total	49	100%	53	100%	34	100%	74	100%	52	100%

*Bulleted numbers indicate the highest response rate.

Table 17 - Continued

Variables	Wrestling				Swimming			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
Decreased Socialization	3	20%	2	28.6%	1	15%	1	50%
Frustration	1	6.7%	1	14.3%	-	-	-	-
Anxiety	1	6.7%	1	14.3%	1	25%	-	-
Decreased Communication	2	13.3%	-	-	1	25%	-	-
Fear of Replacement	3	20%	2	28.6%	1	25%	-	-
Adherence to Rehab Program	4	26.7%	1	14.3%	-	-	1	50%
Other	1	6.7%	-	-	-	-	-	-
Total	15	100%	7	100%	4	100%	2	100%

*Bulleted numbers indicate the highest response rate.

Responses to this question were interpreted by the researcher as either being positive or negative. Positive responses were interpreted as statements reflecting a favorable attitude and optimism with regard to the benefit of mental skills training. Conversely, negative responses were defined as statements reflecting an unfavorable attitude and pessimism with regard to the benefits of mental skills training.

The majority of the respondents ($n=228$, 78.6%) responded to the question in a positive manner. Generally, these participants began their response with the word "yes" and then elaborated by indicating the role of mental skills in injury rehabilitation. For example, one male wrestler responded "Yes, I believe mental skills have a role in injury rehabilitation. Without mental determination and knowing your limits, it's impossible to overcome injury and return to competition at previous levels." A small number of respondents ($n=37$, 12.3%) responded to the question in a negative manner. A female volleyball player responded: "No, because injury is only physical and rehabilitation should be physical as well. I'm not convinced that mental skills will help with rehabilitation." Twenty-five respondents (8.6%) did not respond to the open-ended question. Generally, male and female respondents responded in the same manner. The following is a synopsis of the major themes derived from the positive responses to the open-ended question.

Positive Outlook/Attitude

Sixty-six respondents (28.9%) included in their response statements indicating the importance and benefits of having a positive outlook or attitude while rehabilitating from injury. Specifically, responses suggested how positive thinking helps athletes to achieve goals while rehabilitating from injury and how a positive outlook or attitude contributes to overall confidence and self-esteem. For example, one hockey player responded: "Yes, the

mind is very powerful and the majority of people have no idea that positive thought patterns are the first steps in maintaining a confident state of mind." Further support was indicated by a male basketball player who responded: "Yes, staying positive in rehabilitation is important and mental training can do this." In addition to having a positive outlook and attitude, athletes indicated that setting goals was an important aspect of rehabilitating from an injury.

Goal Setting

Twenty-five percent of respondents ($n=38$) who indicated that mental skills had a role in injury rehabilitation reported that goal setting was a mental skill that they would use and thought that goal setting played a valued role in the rehabilitation process. They stated that goal setting helped them to maintain focus and motivation during rehabilitation as well as reduce the amount of time it would take to return to competition. Further, athletes felt that goal setting would encourage them to work harder and stay dedicated to their injury rehabilitation. One hockey player's response was: "I believe if you set goals and work at them it can have a key role in rehabilitation." A female volleyball player indicated her approval with this response: "Yes, its important to set goals to achieve optimal rehab in the shortest amount of time."

Concentration/Focus

Approximately twenty-four percent of respondents ($n=35$) who supported the use of mental skills in injury rehabilitation reported that concentration and focus were paramount in successful injury rehabilitation. Appropriate concentration and focus allowed athletes to devote their attention to their rehabilitation rather than focus on negative or unproductive thoughts. A male swimmer responded: "I think mental skills are key to motivate rehabilitation efforts. Having focus on immediate goals and diverting focus from training

and competition is difficult and concentration on taking rehab steps is essential. Mental skills help facilitate this focus.” A female basketball player supported this stance by answering: “Yes, because when mentally focused/trained, you will be more inclined to train harder in order to cut down injury time.” These responses are consistent with the findings reported by Leondagis and Fisher (1993). They reported that injured athletes who were able to focus their attention on their rehabilitation programs decreased their recovery time significantly. Several other themes were mentioned in the responses to this open-ended question, including confidence, motivation and background knowledge.

Confidence

The remaining 21.8% (n=49) of respondents who responded to the open-ended question positively, also included confidence, motivation and background knowledge among their responses. Athletes generally felt that using mental skills helped them to maintain their levels of confidence throughout the injury rehabilitation process, as well as provide them with confidence to return to competition once recovered. A female volleyball player stated: “Yes, it allows the player to ease back into playing and develop confidence they may lack due to injury.”

Motivation was a theme that appeared in some responses. Athletes reported that the use of mental skills provided them with the motivation to work hard toward achieving their goal of returning to competition. A male basketball player responded: “Yes, everything is mental, if you believe you can heal sooner than expected, you will, motivation is all you need.”

Several respondents stated that they thought that mental skills training would certainly contribute to injury rehabilitation, however they were concerned that they did not

have the knowledge to implement the appropriate mental skills in their rehabilitation programs. One female basketball player stated, "I'm sure they'd (mental skills) help a great deal if I had the proper knowledge or background in using mental skills."

The majority of AUS athletes in this study indicated that mental skills training has a role in injury rehabilitation. The positive outcome of these responses is encouraging, as it suggests that AUS athletes who face injury rehabilitation programs in the future are likely to be willing to use mental skills training.

Discussion

The purpose of this exploratory study was to examine the practices, opinions and the perceived role of mental skills training in injury rehabilitation among athletes participating in Atlantic University Sports. This study attempted to answer the following five research questions: (1) Do athletes use mental skills training to enhance their athletic performance? (2) How do athletes perceive the role of mental skills training in injury rehabilitation? (3) Do athletes perceive that the implementation of mental skills training during injury rehabilitation would be supported by coaches, team-mates and care givers? (4) Are athletes willing to incorporate mental skills training into future injury rehabilitation programs? (5) Are athletes being provided with the knowledge necessary to implement mental skills training into injury rehabilitation? As commentary has already been presented with the results the following is a brief discussion and synopsis of each research question based on respondents' responses.

The first finding from this study suggests that AUS athletes do use mental skills training in some capacity to enhance their athletic performance. A large number of respondents in this study indicated that they had knowledge of goal setting, positive self-talk, imagery/visualization, relaxation techniques, concentration/focus and to a lesser extent,

arousal control. Approximately half of the respondents reported that they had access to a sport psychologist or mental training consultant. The majority of respondents indicated that they had been introduced to mental skills training between the ages of 10 and 12. Only a very small number of participants reported that they did not use mental skills training at all.

The second research question attempted to gain a better understanding of the perceived role of mental skills training in injury rehabilitation among varsity athletes in Atlantic University Sports (AUS). The majority of respondents supported the implementation of some form of mental skills training in injury rehabilitation programs. Their position is encouraging, as previous research findings (Jevleva and Orlick, 1991; Brewer et. al., 1994) have indicated that using mental skills training in injury rehabilitation programs may be of great benefit to injured athletes. Capul (1998) reported that psychological interventions demonstrated positive outcomes for the improved physical and psychological well-being of injured athletes.

This study also sought to determine whether the athletes thought that their coaches, caregivers and team-mates would encourage the use of mental skills training to assist in injury rehabilitation. The findings indicate that the majority of respondents felt they would be encouraged by their coaches and caregivers, and to a slightly lesser extent, their team-mates. The responses suggest that if coaches, caregivers and athletes had more knowledge and resources available to them, mental skills training in injury rehabilitation programs may become more common, thus allowing athletes the opportunity to rehabilitate in a holistic manner.

AUS athletes in this study indicated that they would consider using mental skills training in future injury rehabilitation programs. Generally athletes indicated that they

valued mental skills training and believed it could potentially play a role in injury rehabilitation. Some athletes did indicate that although they valued this role, they were concerned that they would not have access to the skills and expertise required to successfully incorporate mental skills training in injury rehabilitation.

Although 52.8% of the respondents ($n=157$) to this study indicated that they had access to a sport psychologist or mental training consultant, it appears that many of the participants may not avail themselves of these resources. Several factors may account for this finding. The financial constraints that some university athletic programs encounter may leave athletic directors and coaches struggling to budget for items such as travel expenses, equipment and uniforms and may not enable them to employ an individual specializing in the area of mental skills training. Universities who do have a faculty or staff member specializing in mental skills training may not be able to take advantage of their services for various reasons. Athletes may not be actively encouraged to use these services if the coaching staff does not support mental skills training as an important part of their program. The individual specializing in providing mental skills training may have academic responsibilities or be in high demand by several athletes, thus not having adequate time to invest. Further, the busy schedules of student athletes may leave them with very little time to dedicate to mental skills training. Even injured athletes may use their "free time" to catch up on academic responsibilities or choose to remove themselves as much as possible from their sporting environment. It may also be possible that the social stigma often associated with needing help or seeing a psychologist may deter athletes from seeking care that may be of benefit to them. Finally, the lack of formal mental skills training programs may make it

difficult for this relatively new concept to be considered an integral aspect of sport and injury rehabilitation.

The responses to the fifth research question suggests that AUS athletes may not have the knowledge or skills necessary to implement mental skills training in their injury rehabilitation programs. Some participants indicated that they would use mental skills training in future injury rehabilitation, however the majority of athletes who had previously sustained an injury did not use mental skills as part of their injury rehabilitation programs. This finding suggests that athletes are not using mental skills training in injury rehabilitation. This supports in part, previous research findings that have indicated that athletic trainers do not feel as though they have the knowledge necessary to effectively implement mental skills training in the rehabilitation programs they provide for athletes.

Summary

This chapter presented and discussed the results of the administration of the Trew Mental Skills Training and Injury Rehabilitation Questionnaire to AUS athletes. Overall, these results are encouraging with regard to the use of mental skills training in injury rehabilitation among these athletes. The results suggest that a large number of AUS athletes are aware of and are using mental skills training to enhance their athletic performances. However, the results also suggest that most AUS athletes are currently not using mental skills training in their injury rehabilitation programs. Although athletes display a favourable attitude and are willing to use mental skills training in future injury rehabilitation programs, a number of reasons were provided in an attempt to explain why mental skills training are not being incorporated.

Chapter 5

Summary, Conclusions and Recommendations

Introduction

Initial research in the area of sport psychology and injury focused primarily on the various factors that may predispose athletes to injury. Recent research has focused on the emotional and psychological responses and impact of injury on athletes, as well as various interventions and strategies that may be implemented to facilitate the often tedious rehabilitation process. The purpose of this exploratory study was to examine the practices and opinions of athletes participating in Atlantic University Sport (AUS) in order to gain an understanding of the perceived role of mental skills training and its potential in injury rehabilitation. This chapter outlines the development of the current study, summarizes its findings and provides suggestions and recommendations for future research in the area.

Summary

The Trew Mental Skills Training and Injury Rehabilitation Questionnaire, introductory letters and self-addressed stamped envelopes were forwarded to AUS coaches who had teams that were actively competing at the time of the study. A total of two hundred and ninety AUS athletes who were competing in the sports of basketball, volleyball, hockey, wrestling and swimming responded to the questionnaire. Descriptive statistics were used to summarize the data including measures of central tendency (mean), measures of variability (range and standard deviation) and measures of distribution shapes (frequency distributions and cumulative frequencies). The

investigator used frequency counts, percentages, means and standard deviations as descriptors for numeric valued ordinal variables. Chi squared was calculated to determine whether athletes who believed that mental skills training enhances athletic performance believed equally that their coaches, caregivers and team-mates would encourage them to use mental skills training in injury rehabilitation.

Athletes in this study had a mean age of twenty-one years and the greatest number of athletes were competing in their first year of eligibility. Slightly more than half of the respondents, 52.8% (n=153), reported that they had access to a sport psychologist or mental training consultant. Almost all respondents (95.2%) reported being introduced to mental skills training at either nine years of age and under or between the ages of 10 and 12. When respondents were asked to indicate of which mental skills they had knowledge, almost all, 95.5% (n=277), reported that they had knowledge of goal setting. Respondents also reported having knowledge of imagery/visualization (84.1%), positive self-talk (76.6%), concentration/focus (74.8%), relaxation techniques (64.5%) and arousal control (30.7%). The greatest number of respondents (40%) reported using mental skills training one to two times per week, while only a small number of respondents (13.5%) reported that they did not use mental skills training at all. A large number of respondents, 78.3% (n=227), reported that they had sustained an injury causing them to miss one or more weeks of training or competition. Sixty-one (21%) of the previously injured respondents reported that they used mental skills training during their injury rehabilitation programs.

Generally, AUS athletes indicated that they felt that using mental skills training enhances performance and that they are affected psychologically by injury. Respondents further indicated that they believed their coaches and caregivers would support the use of mental skills training during injury rehabilitation, but that their team-mates would be slightly less likely to do so. Respondents generally agreed that the longer the period of injury rehabilitation, the more likely they would be to use mental skills training and that they were open to using mental skills training in future injury rehabilitation. Finally, the majority of respondents indicated that the most difficult aspect of coping with an injury during rehabilitation was the frustration of not being able to play, followed by the anxiety about recovery time. Athletes were divided in their opinions about the third most difficult aspect of coping with an injury during rehabilitation. The three factors cited most often included adhering to the rehabilitation program, the fear of being replaced and decreased socialization with the team.

Conclusions

The results of this study suggest that AUS athletes use mental skills training in varying capacities to complement the physical, technical and tactical components of training for their sports. These results also suggest that AUS athletes generally support the implementation of mental skills training in injury rehabilitation programs and further agree that they would consider using mental skills training in the future, should they sustain an injury requiring rehabilitation. AUS athletes indicated that their coaches and caregivers and to a slightly lesser extent their team-mates, would support the use of mental skills training in injury rehabilitation. Finally, a high proportion of AUS athletes

who had sustained injuries in the past reported that they did not have the opportunity to implement mental skills training in their injury rehabilitation programs.

Recommendations For Future Research

The intention of this study was to investigate the perceived role of and potential for mental skills training in injury rehabilitation among AUS athletes. The area of mental skills training and injury rehabilitation warrants further research in order to gain a better understanding of this important subject matter and to provide sport psychologists, mental training consultants, coaches, athletic trainers and athletes with the varying levels of knowledge and skills necessary to successfully and effectively incorporate mental skills training in injury rehabilitation.

The Tress Mental Skills Training and Injury Rehabilitation Questionnaire was designed by the investigator and acceptable levels of reliability (0.8738, 0.8319, 0.5474) and content validity were established. Further refinement of this instrument is necessary for future use, to ensure that data is being collected with the utmost precision and is as meaningful as possible. This may be achieved in part by, distributing the questionnaire to experts in various geographic regions in the fields of sport psychology, athletic therapy, coaching and research design. Further administrations could increase the reliability and validity of the questionnaire. Additionally, the findings of this study are confined to the unique geographic region of AUS athletes and may not be generalizable to Canadian Interuniversity Sports athletes or other university athletes. This questionnaire should be distributed to larger sample populations from different geographic regions, beginning with athletes who compete in Canadian Interuniversity Sports and further research could

expand to include elite athletes' access to mental skills training in injury rehabilitation. Standardized methods and protocols must be in place to ensure consistency in the administration of the questionnaire. Further investigation of this instrument by comparing the results among various populations would also contribute to increasing the levels of reliability and validity.

Previous research reviewed indicated that athletic trainers generally support the use of mental skills training in injury rehabilitation. Due to limited knowledge, time constraints and access to sport psychologists or mental training consultants, some athletic trainers have not been able to incorporate mental skills training in their injury rehabilitation programs. Athletic trainers tend to be the primary health care professionals involved with injured athletes so it would be beneficial for them to have the training necessary to offer injured athletes the opportunity to rehabilitate in a holistic manner. Future investigation into athletic therapy training curriculum could help determine how to best incorporate the appropriate knowledge and skills to enable athletic trainers to create and implement individualized mental skills training in injury rehabilitation programs.

Generally, participants in this study reported that they believed that their coaches would encourage them to use mental skills training in injury rehabilitation, however there is little research that has investigated coaches and their perceptions of the role of mental skills training in injury rehabilitation. Further investigation in this area may help establish coach's perspectives and may identify factors that may be inhibiting the use of mental skills training in injury rehabilitation such as financial constraints or limited knowledge. Assuming that most coaches in university sport have certification similar to

that offered by the National Coaching Certification Program, it may be of benefit to include in their curriculum research findings and guidelines to help them understand the value of mental skills training in injury rehabilitation.

Additional research could focus on the experiences of injured athletes who used mental skills training as part of their injury rehabilitation programs. Their experiences, as well as the experiences of their athletic trainers and coaches may be of great value in the development of future training programs. Finding of such work could provide insight for developing individualized injury rehabilitation programs to best suit the needs of injured athletes.

Future research may also investigate athletes who compete in other CIS conferences to determine whether other factors exist that may influence athlete's perceptions of the role of mental skills training in injury rehabilitation. These findings may provide insight as to whether the perceptions of athletes who attend universities in large centres differ from athletes who attend universities in smaller communities. This information may help sport psychologists, mental training consultants, athletic trainers and coaches to implement mental skills training in injury rehabilitation programs, ensuring that the specific needs of all those involved are being met.

The future holds tremendous promise for the incorporation of mental skills training in injury rehabilitation programs. Continued investigation in this area may provide coaches, caregivers and athletes with valuable information suggesting how crucial the implementation of mental skills training in injury rehabilitation programs may be to a holistic, timely and prepared return to competition. Further research in the area of

mental skills training and injury rehabilitation would greatly assist in substantiating the potential value of this procedure.

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Appendix A

Consent Form

*****Please Read Before Beginning the Questionnaire*****

To: All athletes participating in the Mental Training and Injury Questionnaire

My name is Sara Trew and I am currently a graduate student at the School of Human Kinetics and Recreation at Memorial University of Newfoundland. I am conducting a study for my Master's thesis on The Role of Mental Training in Injury Rehabilitation. I would appreciate it if you would take a few minutes to carefully read this page and answer the questionnaire.

Please note that your decision to participate in this study is voluntary and will in no way affect your status with your team. There is no harm or risk associated with participation in this study. As a participant, you will not receive any direct benefits. Please DO NOT write your name or the name of your university anywhere on the questionnaire. Participation in this study is anonymous and confidential. You must be at least 18 years of age in order to participate. Only the researcher and faculty supervisor will have access to collected data.

Completing the questionnaire and returning it to your coach in the envelope provided will be considered an expression of consent. Please return the questionnaire to your coach in the sealed envelope regardless of whether or not you have chosen to complete it. This questionnaire should take approximately 15 minutes to complete and has received the approval of the Interdisciplinary Committee on Ethics in Human Research. The results of this study will be found in my thesis report and will be available upon request.

Should you have any questions or concerns about this study, please contact Sara Trew at (709)879-2318 or by e-mail at s12sajt@mun.ca. If you have any concerns of an ethical or related nature please contact my supervisor, Dr. Basil Kavanagh at (709)733-8676 or by e-mail at baskik@mun.ca. If you have ethical concerns about the research that are not dealt with by the researcher or supervisor, you may contact the Chairperson of ICEHR at icehr@mun.ca or by telephone at (709)733-8368. All correspondence will be confidential.

THANK YOU FOR YOUR HELP.

Sara Trew
MPE Candidate

Please start with Section I

Appendix B

Pilot Study Critique Form

Now that you have completed the questionnaire, I would appreciate it if you would take a few minutes of time to provide feedback based on the below mentioned points.

Thank you in advance for your time and help.

Sara Trew
MPE Candidate

1. *Clarity of instructions.*
2. *Are any questions unclear or awkward?*
3. *Did you object to answering any of the questions?*
4. *Is the layout clear and attractive?*
5. *Are there any syntax, grammatical or typographical errors?*
6. *Any other comments?*

Appendix C

Expert Panel Letter and Critique Form

January 2002

Dear Professor _____,

I have finally completed my graduate course work and am now in the process of starting my thesis. I have received approval from the Ethics Review Committee and am in the process of finalizing my questionnaire. My research topic is **The perceived role of mental training in sport injury rehabilitation among Atlantic Canada's varsity athletes**. It has been suggested that the use of mental skills may greatly enhance the healing process. This research will attempt to determine athlete's current awareness of how mental skills training may be implemented during injury rehabilitation. It will also examine athlete's perceptions of whether mental skills training would be beneficial during rehabilitation. Athlete's willingness to incorporate mental skills training into an injury rehabilitation program will also be investigated.

Enclosed you will find a copy of the consent form for your information as well as a copy of the questionnaire. I would appreciate it if you could take a few minutes of time at your convenience to review the questionnaire and provide me with feedback. Please feel free to comment in the spaces provided below or directly on the questionnaire.

Thank you in advance for your time and expertise.

Sara Tree

MPE Candidate

Expert Panel Critique Form Questions

1. The length of the questionnaire
2. Clarity of instructions
3. Are any questions unclear or ambiguous?
4. Are questions as specific as possible?
5. Did you object to answering any of the questions?
6. Is the layout clear and attractive?
7. Are there any syntax, grammatical or typographical errors?
8. Any other comments?

Appendix D

Introductory Letter To Coaches

January 2003

Coach
University

Dear Coach,

Thank you for your efforts in helping me collect data for my Master's thesis. Enclosed, please find questionnaires and envelopes to be distributed to each athlete, as well as a large self-addressed, stamped envelope for the return of the completed questionnaires.

The questionnaire should take approximately 15 minutes to complete. Please distribute a questionnaire and envelope to each athlete during a team meeting or practice at your convenience. To protect athlete's confidentiality, please leave the area while athletes complete the questionnaire. All athletes should return the questionnaire to you in a sealed envelope whether they have chosen to complete it or not. This is to ensure that athlete's confidentiality and anonymity are protected.

I will be sending you a friendly reminder by e-mail one week after you have received the questionnaires. Please do not hesitate to contact me if you have any questions or concerns (tel: 709-579-2518 / e-mail: x12saj@mun.ca). I will be forwarding the results of this study to you at the beginning of the summer.

Many thanks for your time.

Sincerely,

Sara Trew
MPE Candidate

Appendix E

The Team Mental Skills Training and Injury Rehabilitation Questionnaire - Section 1

Directions: Answer questions 1-4 by circling the appropriate number, and Question 5 by writing your answer in the space provided.

1. Age: 18 19 20 21 22 23 24 25 +
2. Current Year of Eligibility: 1 2 3 4 5
3. Sport: _____

Directions: Please read each question carefully. Answer questions 6-10 by placing a checkmark in the appropriate space.

4. Gender:
☐ Male
☐ Female
5. Does your team have access to either a Mental Training Consultant or Sport Psychologist?
☐ Yes
☐ No
6. Please indicate if you have knowledge of any of the following mental skills.
☐ Goal Setting
☐ Positive Self-Talk/Affirmations
☐ Imagery/Visualization
☐ Relaxation Techniques
☐ Arousal Regulation
☐ Concentration/Focus
☐ Do not have knowledge of any mental skills
☐ Other _____
7. On average, how often do you use mental skills as part of your training program?
☐ 1-2 times per week
☐ 3 or more times per week
☐ Once per month
☐ Not at all
☐ Other, please specify _____
8. At what age were you first introduced to mental skills training?
☐ 9 years of age or under
☐ 10-12 years of age
☐ 13-15 years of age
☐ 16-18 years of age
☐ 19+ years of age
☐ Have never been introduced to mental skills training
9. Have you ever sustained an injury which caused you to miss one or more weeks of training or competition?
☐ Yes
☐ No
10. If you suffered an injury which caused you to miss one or more weeks of training or competition, did you use mental skills training in your injury rehabilitation program?
☐ Yes
☐ No
☐ Not Applicable

Section II

Directions: Read each of the following statements. Circle the most appropriate number beside each statement. Below is a scale representing the value of each number.

Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree
1	2	3	4	5	6	7

- 1 2 3 4 5 6 7 11. I believe that using mental skills training enhances my athletic performance.
- 1 2 3 4 5 6 7 12. I believe that most Atlantic University Sport athletes would be affected psychologically by injury.
- 1 2 3 4 5 6 7 13. I believe that my coach would encourage me to use mental skills training to assist in my injury rehabilitation program.
- 1 2 3 4 5 6 7 14. I believe that my caregiver (athletic trainer/physiotherapist/team doctor/etc.) would encourage me to use mental skills training to assist in my injury rehabilitation program.
- 1 2 3 4 5 6 7 15. I believe that my team-mates would encourage me to use mental skills training to assist in my injury rehabilitation program.
- 1 2 3 4 5 6 7 16. The longer the period of time of injury rehabilitation, the more likely I would be to use mental skills training.
- 1 2 3 4 5 6 7 17. I would be willing to use mental skills training in future injury rehabilitation.

Directions: Place a checkmark in the squares that most apply to you.

18. I believe that I would use the following mental skills to assist in injury rehabilitation.

- ☐ Goal Setting
- ☐ Positive Self-Talk/Affirmations
- ☐ Imagery/Visualization
- ☐ Relaxation Techniques
- ☐ Arousal Regulation
- ☐ Concentration/Focus
- ☐ None of the above
- ☐ Other _____

Section III

Directions: Please answer the following two questions in the spaces provided.

19. Do you think that mental skills have a role in injury rehabilitation? Why or Why Not?

20. Using a scale of 1 to 5, (1 being the most difficult), rank what you feel to be the five most difficult aspects of coping with an injury during rehabilitation.

- _____ Decreased socialization with team.
- _____ Frustration of not being able to play.
- _____ Anxiety about recovery time.
- _____ Decreased communication with coaching staff.
- _____ Fear of being replaced.
- _____ Adhering to the rehabilitation program.
- _____ Other _____

Appendix F

**Athlete's Beliefs About Mental Skills Training
Enhance Versus Coach**

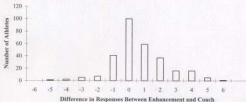


Figure 1: This histogram represents the distribution of the differences in the scale scores of the Trew Mental Skills Training and Injury Rehabilitation Questionnaire of athletes' beliefs that mental skills training enhances athletic performance and athletes' beliefs that their coaches would encourage them to use mental skills training in injury rehabilitation.

Appendix G

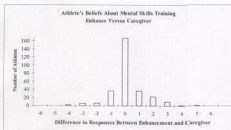


Figure 2: This histogram represents the distribution of the differences in the scale scores of the *Team Mental Skills Training and Injury Rehabilitation Questionnaire* of athletes' beliefs that mental skills training enhances athletic performance and athletes' beliefs that their caregivers would encourage them to use mental skills training in injury rehabilitation.

Appendix H

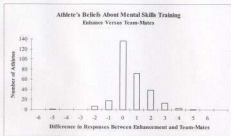


Figure 3: This histogram represents the distribution of the differences in the scale scores of the *Trew Mental Skills Training and Rehabilitation Questionnaire* of athletes' beliefs that mental skills training enhances athletic performance and athlete's beliefs that their team-mates would encourage them to use mental skills training in injury rehabilitation.

